CLEAN DEVELOPMENT MECHANISM
SMALL-SCALE PROGRAMME OF ACTIVITIES DESIGN DOCUMENT FORM
(CDM-SSC-PoA-DD) Version 01

CONTENTS

Annexes

NOTE:

(i) This form is for the submission of a CDM PoA whose CPAs apply a small scale approved methodology.

(ii) At the time of requesting registration this form must be accompanied by a CDM-SSC-CPA-DD form that has been specified for the proposed PoA, as well as by one completed CDM-SSC-CPA-DD (using a real case).

SECTION A. General description of small-scale programme of activities (PoA)

A.1 Title of the small-scale programme of activities (PoA):

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Title: Methane Utilisation and Destruction Programme from Industrial Wastewater in DPR Korea
Version: 08
Date: 07/12/2012

A.2. Description of the small-scale programme of activities (PoA):

>> The following information shall be included here:

1. General operating and implementing framework of PoA

Industrial wastewater from industries including but not limited to foodstuff, pulp & paper, and fibre & textile in the territory of the DPR Korea, is generating methane that is released into the atmosphere without destruction and/or utilisation.

The DPR Korea has in excess of 100 small to medium sized factories which emit methane from its organic wastewater directly into the atmosphere. Most of these installations treat their wastewater in open lagoons, thereby emitting large amounts of methane directly into the atmosphere.

The DPR Korea is looking to increase its economic activity and any increase in economic activity will lead to increased levels of emissions at these installations.

The DPR Korea currently lacks financial resources in order to implement emission reduction projects on a wide scale. The "Methane Utilisation and Destruction Programme from Industrial Wastewater in DPR Korea" (herein after referred to as the "PoA") aims to support the DPR Korea's efforts to move to a low-carbon future.

The coordinating/managing entity (CME) is required to finance the investment of the PoA and individual CDM Project Activities (CPAs) included in the PoA from its own funds. The DPR Korea has confirmed that it will not provide finance for the development or implementation of the CPAs. The CME will also provide technical expertise and services in relation to CDM and the project implementation.

2. Policy/measure or stated goal of the PoA

The PoA aims to reduce GHG emissions by capturing methane from industrial wastewater in the territory of the DPR Korea as follows:

(a) Substitution of aerobic wastewater or sludge treatment systems with anaerobic systems with biogas recovery and combustion;

(b) Introduction of anaerobic sludge treatment system with biogas recovery and combustion to a wastewater treatment plant without sludge treatment;

(c) Introduction of biogas recovery and combustion to a sludge treatment system;

(d) Introduction of biogas recovery and combustion to an anaerobic wastewater treatment system such as anaerobic reactor, lagoon, septic tank or an on site industrial plant;

(e) Introduction of anaerobic wastewater treatment with biogas recovery and combustion, with or without anaerobic sludge treatment, to an untreated wastewater stream;

(f) Introduction of a sequential stage of wastewater treatment with biogas recovery and combustion, with or without sludge treatment, to an anaerobic wastewater treatment system without biogas recovery (e.g. introduction of treatment in an anaerobic reactor with biogas recovery as a sequential treatment step for the wastewater that is presently being treated in an anaerobic lagoon without methane recovery).

Each CPA will either utilise the methane from industrial wastewater for electricity and/or heat generation and/or destroy the methane through flaring. The combustion of methane in a boiler and/or electricity generator and/or flare results in a significant emission reduction. Emission reductions associated with a Type I methodology will not be claimed under this PoA.

The government of the DPR Korea currently has no policy measures in place to capture and utilise or destroy methane from industrial wastewater facilities. The DPR Korea also does not offer any financial incentives for the implementation of the PoA or a CPA.

The PoA aims to identify sites where methane capture and utilisation or destruction can be implemented economically. The goal of the PoA is to identify as many sites as possible and to implement methane capture and utilisation and/or destruction to reduce the maximum amount of GHGs subject to economic viability by employing technology that has a proven track record.

The expected result of the PoA is a significant reduction of GHG emissions compared to the emissions that would occur in the absence of the PoA. The PoA also contributes to sustainable economic development in the DPR Korea and generates various social benefits.

The benefits of the PoA are as follows:

A. Environmental benefits:

The PoA will contribute to GHG emission reductions in the DPR Korea and therefore will also contribute to the mitigation of adverse impacts of climate change, both locally and globally. If a CPA demonstrates its feasibility for electricity and/or heat generation, then an additional environmental benefit will be the displacement of coal as source for electricity and/or heat generation.

B. Social and economic benefits:

The PoA will utilize the captured methane as an energy source, which would otherwise be wasted by being released into the atmosphere under the baseline scenario. The propose PoA raises awareness of unutilized sources of energy and contributes to an increase in the efficiency of the utilisation of resources. As the PoA will establish the first industrial wastewater methane utilisation and destruction project in the DPR Korea, it will also demonstrate progress towards reducing emissions in the DPR Korea in order to mitigate the adverse impacts of climate change globally. The PoA brings new technology to the DPR Korea. Additionally, the PoA will create employment as the monitoring process will require data collection, preparation and dissemination.

C. Other benefits:

The PoA allows individual CPAs to apply a unified CDM registration framework, thereby lowering the costs for CPA implementation. As a result of the reduced transaction costs, more CPAs can be implemented that would otherwise not be economically viable.

These benefits demonstrate that the PoA contributes to global GHG emission reductions as well as to sustainable development in the DPR Korea.

3. Confirmation that the proposed PoA is a voluntary action by the coordinating/managing entity.

The coordinating/managing entity for the PoA is Carbon Development and Trading Ltd.

The PoA is a voluntary action undertaken by Carbon Development and Trading Ltd. Currently the DPR Korea does not have any laws or policies that require the capture of methane from industrial wastewater facilities. The Ministry of Land and Environment Protection in its letter dated 27/01/2012 confirmed that there is currently no requirement to capture and utilise or destroy methane from industrial wastewater facilities in the DPR Korea. As there are no laws that enforce the capture of methane from industrial wastewater facilities in the DPR Korea, the CME is not by law obliged to implement the PoA.

A.3. Coordinating/managing entity and participants of SSC-POA:

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1. Coordinating or managing entity of the PoA as the entity which communicates with the Board:

   Carbon Development and Trading Ltd is the coordinating/managing entity (CME) for this PoA.

2. Project participants being registered in relation to the PoA. Project participants may or may not be involved in one of the CPAs related to the PoA.

Party involved (*) ((host) indicates a host Party)	Legal entity project participant (as applicable)	Please indicate if the Party involved wishes to be considered as project participant (Yes/No)
Democratic People's Republic of Korea (host)	General Bureau for Cooperation with International Organizations	No
Democratic People's Republic of Korea (host)	Carbon Development and Trading Ltd	No

The project at the time of registration is a unilateral CDM project.

The General Bureau for Cooperation with International Organizations (GBCIO) has been tasked by the government of the DPR Korea to promote the implementation of CDM projects in the DPR Korea. In this PoA, the GBCIO supports and CME on an ongoing basis with the implementation of the CPAs.

A.4. Technical description of the small-scale programme of activities:

A.4.1. Location of the programme of activities:

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The PoA is located within the political boundary of the Democratic People's Republic of Korea.

A.4.1.1. Host Party(ies):

>>
Democratic People's Republic of Korea

A.4.1.2. Physical/ Geographical boundary:

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The geographical boundary for the PoA includes all areas of the Democratic People's Republic of Korea (DPR Korea). The DPR Korea has geographic reference +40°00'N, +127°00'E.

Figure-1 shows the geographical boundary of the PoA.

A.4.2. Description of a typical small-scale CDM programme activity (CPA):

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A typical CPA includes the introduction of biogas recovery and combustions systems compared with the current practise of venting methane into the atmosphere from open wastewater lagoons.

Each CPA will either destroy the captured methane through combustion in a flare or utilise the captured methane for further use as outlined in this PoA.

A.4.2.1. Technology or measures to be employed by the SSC-CPA:

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The PoA is a Small Scale PoA with Sectoral Scope 13. The PoA consists of CPAs with the same technical concept. Currently methane from industrial wastewater is vented into the atmosphere. Generally, open lagoons are used for wastewater treatment and those lagoons do not have any methane capture systems in place.

Each CPA will adopt one or a combination of the following technologies or measures:

(a) Substitution of aerobic wastewater or sludge treatment systems with anaerobic systems with biogas recovery and combustion;

(b) Introduction of anaerobic sludge treatment system with biogas recovery and combustion to a wastewater treatment plant without sludge treatment;

(c) Introduction of biogas recovery and combustion to a sludge treatment system;

(d) Introduction of biogas recovery and combustion to an anaerobic wastewater treatment system such as anaerobic reactor, lagoon, septic tank or an on site industrial plant;

(e) Introduction of anaerobic wastewater treatment with biogas recovery and combustion, with or without anaerobic sludge treatment, to an untreated wastewater stream;

(f) Introduction of a sequential stage of wastewater treatment with biogas recovery and combustion, with or without sludge treatment, to an anaerobic wastewater treatment system without biogas recovery (e.g. introduction of treatment in an anaerobic reactor with biogas recovery as a sequential treatment step for the wastewater that is presently being treated in an anaerobic lagoon without methane recovery).

The technologies or measures listed above are in accordance with approved CDM Methodology AMS-III.H. (Version 16).

There is currently no legal requirement in the DPR Korea to utilise or destroy methane from industrial wastewater in the territory of the DPR Korea. The Ministry of Land and Environment Protection has been requested by the CME to clarify the applicable national and/or sectoral policies and regulations relevant to methane emitted from industrial wastewater facilities in the DPR Korea. The Ministry of Land and Environment Protection in its letter dated 27/01/2012 confirmed that there is currently no requirement to capture and/or utilise or destroy methane from industrial wastewater facilities in the DPR Korea.

The PoA will utilise flares and/or heat generation and/or electricity generation equipment that captures and destroys and/or utilises methane from industrial wastewater.

Technology will be employed CPA specific and will vary according to the CPA requirements. For all CPAs, methane from industrial wastewater will be used.

Each CPA may include one or more flares and/or one or more boilers for heat generation and/or one or more power generation units.

As the DPR Korea currently does not have biogas recovery and combustions systems in place, the CME anticipates that all technology, equipment and expertise will initially be provided to the DPR Korea through foreign experts and manufacturers. Such transfer would occur through the import of appropriate equipment to the DPR Korea, such as piping, pumps and flaring technology, and employing foreign experts in the engineering and implementation of the individual CPAs. As the technology for capturing and destroying/utilising methane from industrial wastewater facilities is already available in non Annex-I countries, it is not compulsory for technology transfer from an Annex I country and it is more likely that technology will be imported from other Asian countries that are non-Annex I countries.

The CME envisages that training will be provided to the workforce in the DPR Korea in order to ensure that the equipment can be maintained in accordance with manufacturer specifications. Training will be

provided to people on a CPA-specific basis and will be performed by the relevant equipment manufacturers as appropriate. Additionally, people at each CPA-site will be trained to perform monitoring.

A.4.2.2. Eligibility criteria for inclusion of a SSC-CPA in the PoA:

>> Here only a description of criteria for enrolling the CPA shall be described, the criteria for demonstrating additionality of CPA shall be described in section E.5

The following eligibility criteria are applicable for the inclusion of a CPA in the PoA:

1. Criterion: The geographic boundary of the CPA lies within the DPR Korea.
   Evidence: The CPA shall demonstrate this in the CPA-DD for each CPA by listing the GPS coordinates of the CPA site or by obtaining a letter from a competent authority in the DPR Korea confirming that the CPA is located within the political boundary of the DPR Korea. GPS coordinates, if used, shall be validated through on-site visit and/or through photographic evidence and/or by comparing the GPS coordinates with official maps.

2. Criterion: To meet the conditions that avoid double counting of emission reductions, the proposed CPA under this PoA has not been and will not be either registered as a single CDM project activity or included as a CPA under another PoA. A unique identification number will be included in the specific CPA-DD for each industrial installation.
   Evidence: Geographical coordinates of each industrial wastewater facility will be the basis for the unique identification number. The CME shall confirm that the CPA is not included in the PoA or another PoA. The CME shall provide the date on which it consulted the CDM Project Database. The CME shall also confirm details regarding the unique identification number (IWW-DPRK-X) that the CME has assigned to the CPA.

3. Criterion: The CPA reduces GHG emissions by utilising methane from industrial wastewater for electricity and/or heat generation and/or destroying methane through flaring by adopting one or a combination of the following technologies or measures:

   a) Substitution of aerobic wastewater or sludge treatment systems with anaerobic systems with biogas recovery and combustion;

   b) Introduction of anaerobic sludge treatment system with biogas recovery and combustion to a wastewater treatment plant without sludge treatment;

   c) Introduction of biogas recovery and combustion to a sludge treatment system;

   d) Introduction of biogas recovery and combustion to an anaerobic wastewater treatment system such as anaerobic reactor, lagoon, septic tank or an on site industrial plant;

   e) Introduction of anaerobic wastewater treatment with biogas recovery and combustion, with or without anaerobic sludge treatment, to an untreated wastewater stream;

   f) Introduction of a sequential stage of wastewater treatment with biogas recovery and combustion, with or without sludge treatment, to an anaerobic wastewater treatment system without biogas recovery (e.g. introduction of treatment in an anaerobic reactor with biogas recovery as a sequential treatment step for the wastewater that is presently being treated in an anaerobic lagoon without methane recovery).

Evidence: The CME shall review each CPA and its project plan when preparing the CPA-DD, The CME shall clearly demonstrate in the CPA-DD that the CPA fulfils this criterion by providing a project description sufficiently detailed to ensure compliance with this criterion. The CPA-DD shall clearly demonstrate which measure/technology was adopted for the CPA or which combination of technologies/measures have been adopted.

4. Criterion The starting date of the CPA is the earliest date at which either the implementation or construction or real action of a CDM project activity, and it cannot be prior to 22/01/ 2012, the commencement of validation (date of beginning of the Global Stakeholder Process posted on the UNFCCC website).
Evidence: The start date of the CPA shall be clearly described in the CPA-DD. The CME shall ensure that the CPA has not started before the validation of the PoA by including documentary evidence that can include but is not limited to site visits performed or photographic evidence taken (with time stamps) or contractual agreements entered into by the CPA owner or CME and/or letter from a competent authority confirming the CPA start date.

5. Criterion: The existing Approved CDM Methodology AMS-III.H. (Version 16) is applicable to the CPA. The applicability criteria are as follows:

(I) If a CPA adopts the measure/technology a) Substitution of aerobic wastewater or sludge treatment systems with anaerobic systems with biogas recovery and combustion, then the following applicability criteria have to be fulfilled:

Applicability to wastewater treatment technology/measure:	
Substitution of aerobic wastewater or sludge treatment systems with anaerobic systems with biogas recovery and combustion.	The CPA shall demonstrate that this measure/technology is being used in the specific CPA either on its own or in combination with other technologies/measures. This shall be clearly described in the CPA-DD.

Applicability to use of recovered biogas:	
Thermal or mechanical, electrical energy generation directly.	The CPA shall demonstrate whether the recovered biogas is used for thermal or mechanical, electrical energy generation directly. This shall be clearly described in the CPA-DD.

Applicability to other criteria:	
New facilities (Greenfield projects) and project activities involving a change of equipment resulting in a capacity addition of the wastewater or sludge treatment system compared to the designed capacity of the baseline treatment system are only eligible to apply this methodology if they comply with the relevant requirements in the “General guidelines to SSC CDM methodologies”. In addition the requirements for demonstrating the	The CPA, if it is a new facility (Greenfield project) or a project activity involving a change of equipment resulting in a capacity addition of the wastewater or sludge treatment system compared to the designed capacity of the baseline treatment system, then the CPA shall demonstrate that it complies with the "General guidelines to SSC CDM methodologies”. In addition the requirements for demonstrating the remaining lifetime of the equipment replaced, as described in the general guidelines shall be

remaining lifetime of the equipment replaced, as described in the general guidelines shall be followed.	followed. This shall be clearly described in the CPA-DD.
The location of the wastewater treatment plant as well as the source generating the wastewater shall be uniquely defined and described in the CPA-DD.	The CPA shall uniquely identify the location of the wastewater treatment plant as well as the source generating the wastewater and describe this in the CPA-DD. The location and source of wastewater shall be uniquely defined using GPS coordinates or confirmed by a competent authority in the DPR Korea.
Aggregate emissions reductions of less than or equal to 60 kt CO_2 equivalent annually.	The CPA shall demonstrate that its aggregate emission reductions are less than or equal to 60 kt CO_2 equivalent annually. This shall be clearly described in the CPA-DD.

(II) If a CPA adopts the measure/technology b) Introduction of anaerobic sludge treatment system with biogas recovery and combustion to a wastewater treatment plant without sludge treatment, then the following applicability criteria have to be fulfilled:

Applicability to wastewater treatment technology/measure:	
Introduction of anaerobic sludge treatment system with biogas recovery and combustion to a wastewater treatment plant without sludge treatment.	The CPA shall demonstrate that this measure/technology is being used in the specific CPA either on its own or in combination with other technologies/measures. This shall be clearly described in the CPA-DD.

Applicability to anaerobic wastewater lagoons in the baseline scenario:	
The lagoons are ponds with a depth greater than two meters, without aeration. The value for depth is obtained from engineering design documents, or through direct measurement, or by dividing the surface area by the total volume. If the lagoon filling level varies seasonally, the average of the highest and lowest levels may be taken.	The CPA shall clearly demonstrate that anaerobic wastewater lagoons in the baseline scenario have a depth of more than two meters, without aeration. . This shall be clearly described in the CPA-DD.
Ambient temperature above 15°C, at least during part of the year, on a monthly average basis.	The CPA shall demonstrate that the ambient temperature is above 15°C, at least during part of the year, on a monthly average basis. This shall be clearly described in the CPA-DD.
The minimum interval between two consecutive sludge removal events shall be 30 days.	Each CPA shall demonstrate that the minimum interval between two consecutive sludge removal events shall be 30 days. This shall be clearly described in the CPA-DD.

Applicability to use of recovered biogas:	
Thermal or mechanical, electrical energy generation directly.	The CPA shall demonstrate whether the recovered biogas is used for thermal or

	mechanical, electrical energy generation directly. This shall be clearly described in the CPA-DD.

Applicability to other criteria:	
New facilities (Greenfield projects) and project activities involving a change of equipment resulting in a capacity addition of the wastewater or sludge treatment system compared to the designed capacity of the baseline treatment system are only eligible to apply this methodology if they comply with the relevant requirements in the "General guidelines to SSC CDM methodologies". In addition the requirements for demonstrating the remaining lifetime of the equipment replaced, as described in the general guidelines shall be followed.	The CPA, if it is a new facility (Greenfield project) or a project activity involving a change of equipment resulting in a capacity addition of the wastewater or sludge treatment system compared to the designed capacity of the baseline treatment system, then the CPA shall demonstrate that it complies with the "General guidelines to SSC CDM methodologies". In addition the requirements for demonstrating the remaining lifetime of the equipment replaced, as described in the general guidelines shall be followed. This shall be clearly described in the CPA-DD.
The location of the wastewater treatment plant as well as the source generating the wastewater shall be uniquely defined and described in the CPA-DD.	The CPA shall uniquely identify the location of the wastewater treatment plant as well as the source generating the wastewater and describe this in the CPA-DD. The location and source of wastewater shall be uniquely defined using GPS coordinates or confirmed by a competent authority in the DPR Korea.
Aggregate emissions reductions of less than or equal to 60 kt CO_2 equivalent annually.	The CPA shall demonstrate that its aggregate emission reductions are less than or equal to 60 kt CO_2 equivalent annually. This shall be clearly described in the CPA-DD.

(III) If a CPA adopts the measure/technology c) Introduction of biogas recovery and combustion to a sludge treatment system, then the following applicability criteria have to be fulfilled:

Applicability to wastewater treatment technology/measure:	
Introduction of biogas recovery and combustion to a sludge treatment system.	The CPA shall demonstrate that this measure/technology is being used in the specific CPA either on its own or in combination with other technologies/measures. This shall be clearly described in the CPA-DD.

Applicability to anaerobic wastewater lagoons in the baseline scenario:	
The lagoons are ponds with a depth greater than two meters, without aeration. The value for depth is obtained from engineering design documents, or through direct measurement, or by dividing the surface area by the total volume. If the	The CPA shall clearly demonstrate that anaerobic wastewater lagoons in the baseline scenario have a depth of more than two meters, without aeration. . This shall be clearly described in the CPA-DD.

lagoon filling level varies seasonally, the average of the highest and lowest levels may be taken.	
Ambient temperature above 15°C, at least during part of the year, on a monthly average basis.	The CPA shall demonstrate that the ambient temperature is above 15°C, at least during part of the year, on a monthly average basis. This shall be clearly described in the CPA-DD.
The minimum interval between two consecutive sludge removal events shall be 30 days.	Each CPA shall demonstrate that the minimum interval between two consecutive sludge removal events shall be 30 days. This shall be clearly described in the CPA-DD.

Applicability to use of recovered biogas:	
Thermal or mechanical, electrical energy generation directly.	The CPA shall demonstrate whether the recovered biogas is used for thermal or mechanical, electrical energy generation directly. This shall be clearly described in the CPA-DD.

Applicability to other criteria:	
New facilities (Greenfield projects) and project activities involving a change of equipment resulting in a capacity addition of the wastewater or sludge treatment system compared to the designed capacity of the baseline treatment system are only eligible to apply this methodology if they comply with the relevant requirements in the "General guidelines to SSC CDM methodologies". In addition the requirements for demonstrating the remaining lifetime of the equipment replaced, as described in the general guidelines shall be followed.	The CPA, if it is a new facility (Greenfield project) or a project activity involving a change of equipment resulting in a capacity addition of the wastewater or sludge treatment system compared to the designed capacity of the baseline treatment system, then the CPA shall demonstrate that it complies with the "General guidelines to SSC CDM methodologies". In addition the requirements for demonstrating the remaining lifetime of the equipment replaced, as described in the general guidelines shall be followed. This shall be clearly described in the CPA-DD.
The location of the wastewater treatment plant as well as the source generating the wastewater shall be uniquely defined and described in the CPA-DD.	The CPA shall uniquely identify the location of the wastewater treatment plant as well as the source generating the wastewater and describe this in the CPA-DD. The location and source of wastewater shall be uniquely defined using GPS coordinates or confirmed by a competent authority in the DPR Korea.
Aggregate emissions reductions of less than or equal to 60 kt CO_2 equivalent annually.	The CPA shall demonstrate that its aggregate emission reductions are less than or equal to 60 kt CO_2 equivalent annually. This shall be clearly described in the CPA-DD.

(IV) If a CPA adopts the measure/technology d) Introduction of biogas recovery and combustion to an anaerobic wastewater treatment system such as anaerobic reactor, lagoon, septic tank or an

on-site industrial plant, then the following applicability criteria have to be fulfilled:

Applicability to wastewater treatment technology/measure:	
Introduction of biogas recovery and combustion to an anaerobic wastewater treatment system such as anaerobic reactor, lagoon, septic tank or an on-site industrial plant.	The CPA shall demonstrate that this measure/technology is being used in the specific CPA either on its own or in combination with other technologies/measures. This shall be clearly described in the CPA-DD.

Applicability to anaerobic wastewater lagoons in the baseline scenario:	
The lagoons are ponds with a depth greater than two meters, without aeration. The value for depth is obtained from engineering design documents, or through direct measurement, or by dividing the surface area by the total volume. If the lagoon filling level varies seasonally, the average of the highest and lowest levels may be taken.	The CPA shall clearly demonstrate that anaerobic wastewater lagoons in the baseline scenario have a depth of more than two meters, without aeration. . This shall be clearly described in the CPA-DD.
Ambient temperature above 15°C, at least during part of the year, on a monthly average basis.	The CPA shall demonstrate that the ambient temperature is above 15°C, at least during part of the year, on a monthly average basis. This shall be clearly described in the CPA-DD.
The minimum interval between two consecutive sludge removal events shall be 30 days.	Each CPA shall demonstrate that the minimum interval between two consecutive sludge removal events shall be 30 days. This shall be clearly described in the CPA-DD.

Applicability to use of recovered biogas:	
Thermal or mechanical, electrical energy generation directly.	The CPA shall demonstrate whether the recovered biogas is used for thermal or mechanical, electrical energy generation directly. This shall be clearly described in the CPA-DD.

Applicability to other criteria:	
New facilities (Greenfield projects) and project activities involving a change of equipment resulting in a capacity addition of the wastewater or sludge treatment system compared to the designed capacity of the baseline treatment system are only eligible to apply this methodology if they comply with the relevant requirements in the “General guidelines to SSC CDM methodologies”. In addition the requirements for demonstrating the remaining lifetime of the equipment replaced, as described in the general	The CPA, if it is a new facility (Greenfield project) or a project activity involving a change of equipment resulting in a capacity addition of the wastewater or sludge treatment system compared to the designed capacity of the baseline treatment system, then the CPA shall demonstrate that it complies with the "General guidelines to SSC CDM methodologies”. In addition the requirements for demonstrating the remaining lifetime of the equipment replaced, as described in the general guidelines shall be followed. This shall be clearly described in the CPA-DD.

guidelines shall be followed.	
The location of the wastewater treatment plant as well as the source generating the wastewater shall be uniquely defined and described in the CPA-DD.	The CPA shall uniquely identify the location of the wastewater treatment plant as well as the source generating the wastewater and describe this in the CPA-DD. The location and source of wastewater shall be uniquely defined using GPS coordinates or confirmed by a competent authority in the DPR Korea.
Aggregate emissions reductions of less than or equal to 60 kt CO_2 equivalent annually.	The CPA shall demonstrate that its aggregate emission reductions are less than or equal to 60 kt CO_2 equivalent annually. This shall be clearly described in the CPA-DD.

(V) If a CPA adopts the measure/technology e) Introduction of anaerobic wastewater treatment with biogas recovery and combustion, with or without anaerobic sludge treatment, to an untreated

Applicability to wastewater treatment technology/measure:	
Introduction of anaerobic wastewater treatment with biogas recovery and combustion, with or without anaerobic sludge treatment, to an untreated wastewater stream.	The CPA shall demonstrate that this measure/technology is being used in the specific CPA either on its own or in combination with other technologies/measures. This shall be clearly described in the CPA-DD.

Applicability to use of recovered biogas:	
Thermal or mechanical, electrical energy generation directly.	The CPA shall demonstrate whether the recovered biogas is used for thermal or mechanical, electrical energy generation directly. This shall be clearly described in the CPA-DD.

Applicability to other criteria:	
New facilities (Greenfield projects) and project activities involving a change of equipment resulting in a capacity addition of the wastewater or sludge treatment system compared to the designed capacity of the baseline treatment system are only eligible to apply this methodology if they comply with the relevant requirements in the "General guidelines to SSC CDM methodologies". In addition the requirements for demonstrating the remaining lifetime of the equipment replaced, as described in the general guidelines shall be followed.	The CPA, if it is a new facility (Greenfield project) or a project activity involving a change of equipment resulting in a capacity addition of the wastewater or sludge treatment system compared to the designed capacity of the baseline treatment system, then the CPA shall demonstrate that it complies with the "General guidelines to SSC CDM methodologies". In addition the requirements for demonstrating the remaining lifetime of the equipment replaced, as described in the general guidelines shall be followed. This shall be clearly described in the CPA-DD.
The location of the wastewater treatment plant as well as the source generating the wastewater shall be uniquely defined and	The CPA shall uniquely identify the location of the wastewater treatment plant as well as the source generating the wastewater and describe

described in the CPA-DD.	this in the CPA-DD. The location and source of wastewater shall be uniquely defined using GPS coordinates or confirmed by a competent authority in the DPR Korea.
Aggregate emissions reductions of less than or equal to 60 kt CO_2 equivalent annually.	The CPA shall demonstrate that its aggregate emission reductions are less than or equal to 60 kt CO_2 equivalent annually. This shall be clearly described in the CPA-DD.

(VI) If a CPA adopts the measure/technology f) Introduction of a sequential stage of wastewater treatment with biogas recovery and combustion, with or without sludge treatment, to an anaerobic wastewater treatment system without biogas recovery (e.g. introduction of treatment in an anaerobic reactor with biogas recovery as a sequential treatment step for the wastewater that is presently being treated in an anaerobic lagoon without methane recovery), then the following applicability criteria have to be fulfilled:

Applicability to wastewater treatment technology/measure:	
Introduction of a sequential stage of wastewater treatment with biogas recovery and combustion, with or without sludge treatment, to an anaerobic wastewater treatment system without biogas recovery (e.g. introduction of treatment in an anaerobic reactor with biogas recovery as a sequential treatment step for the wastewater that is presently being treated in an anaerobic lagoon without methane recovery).	The CPA shall demonstrate that this measure/technology is being used in the specific CPA either on its own or in combination with other technologies/measures. This shall be clearly described in the CPA-DD.

Applicability to anaerobic wastewater lagoons in the baseline scenario:	
The lagoons are ponds with a depth greater than two meters, without aeration. The value for depth is obtained from engineering design documents, or through direct measurement, or by dividing the surface area by the total volume. If the lagoon filling level varies seasonally, the average of the highest and lowest levels may be taken.	The CPA shall clearly demonstrate that anaerobic wastewater lagoons in the baseline scenario have a depth of more than two meters, without aeration. . This shall be clearly described in the CPA-DD.
Ambient temperature above 15°C, at least during part of the year, on a monthly average basis.	The CPA shall demonstrate that the ambient temperature is above 15°C, at least during part of the year, on a monthly average basis. This shall be clearly described in the CPA-DD.
The minimum interval between two consecutive sludge removal events shall be 30 days.	Each CPA shall demonstrate that the minimum interval between two consecutive sludge removal events shall be 30 days. This shall be clearly described in the CPA-DD.

Applicability to use of recovered biogas:	
Thermal or mechanical, electrical energy generation directly.	The CPA shall demonstrate whether the recovered biogas is used for thermal or mechanical, electrical energy generation directly. This shall be clearly described in the CPA-DD.

Applicability to other criteria:	
New facilities (Greenfield projects) and project activities involving a change of equipment resulting in a capacity addition of the wastewater or sludge treatment system compared to the designed capacity of the baseline treatment system are only eligible to apply this methodology if they comply with the relevant requirements in the "General guidelines to SSC CDM methodologies". In addition the requirements for demonstrating the remaining lifetime of the equipment replaced, as described in the general guidelines shall be followed.	The CPA, if it is a new facility (Greenfield project) or a project activity involving a change of equipment resulting in a capacity addition of the wastewater or sludge treatment system compared to the designed capacity of the baseline treatment system, then the CPA shall demonstrate that it complies with the "General guidelines to SSC CDM methodologies". In addition the requirements for demonstrating the remaining lifetime of the equipment replaced, as described in the general guidelines shall be followed. This shall be clearly described in the CPA-DD.
The location of the wastewater treatment plant as well as the source generating the wastewater shall be uniquely defined and described in the CPA-DD.	The CPA shall uniquely identify the location of the wastewater treatment plant as well as the source generating the wastewater and describe this in the CPA-DD. The location and source of wastewater shall be uniquely defined using GPS coordinates or confirmed by a competent authority in the DPR Korea.
Aggregate emissions reductions of less than or equal to 60 kt CO_2 equivalent annually.	The CPA shall demonstrate that its aggregate emission reductions are less than or equal to 60 kt CO_2 equivalent annually. This shall be clearly described in the CPA-DD.

Evidence: The CME shall ensure that each CPA fulfils the applicability criteria as outlined above through description of the relevant information in the CPA-DD, through confirmation from a competent authority in the DPR Korea or by other applicable means, such as GPS coordinates.

6. Criterion: The proposed project activity has to be voluntary action by the industrial installations involved in the CPA under the PoA and the implementation of the proposed project activity is not to fulfil any mandatory policy or regulation.
   Evidence: A letter issued by the CPA owner. Additionally, this information shall be confirmed by a competent authority in the DPR Korea, such as the Ministry of Land and Environment Protection or other competent Ministry.

7. Criterion: In accordance with the "Guidelines on the demonstration of additionality of small-scale project activities" (Version 09.0), the PoA chooses Option a) Investment barrier to demonstrate additionality. To demonstrate that the CPA faces the investment barrier, the CPA should meet the following criteria:

(i) That there is no legal requirement that is enforced for the CPA to be implemented; and
(ii) That there are no benefits to the CME besides CDM Revenue; and
(iii) That the CME will have to provide all capital for the implementation of the CPA and that such business framework for the implementation of CDM Programmes of Activities in the DPR Korea is equally applicable to all foreign investors.

Evidence: The fulfilment of the criterion shall be evidenced through confirmation from competent authorities in the DPR Korea

8. Criterion: The CPA has to perform a local stakeholder consultation before it may be included in the PoA.
Evidence: The stakeholder consultation shall be described in the CPA-DD and documentary evidence provided, including but not limited to, stakeholder questionnaires distributed and meeting minutes recorded during the stakeholder consultation process. Any issues identified during the stakeholder consultation shall be resolved to the satisfaction of the stakeholders before the inclusion of the CPA in the PoA.

9. Criterion: The CPA has to ensure that environmental analysis has been performed.
Evidence: The environmental analysis shall be performed by the CME and described in the CPA-DD for each CPA. Any issues identified during the environmental analysis shall be resolved to the satisfaction of the stakeholders before the inclusion of the CPA in the PoA.

10. Criterion: The CME confirms in a written statement that no funding from an Annex 1 party is provided for the CPA.
Evidence: The CME shall issue a letter and provide supporting documentation such as bank statements.

11. Criterion: The proposed CPA is not a debundled project activity. No other project activity may be within 1 km of the project boundary of the proposed small-scale activity at the closest point.
Evidence: The CME shall provide confirmation that it consulted the CDM Project Database including the date on which it consulted the CDM Project Database.

12. Criterion: For the purpose of determining baseline emissions, a CPA, in the pre-project scenario, released all methane into the atmosphere without destruction or utilisation.
Evidence: The baseline scenario shall be clearly described in the CPA-DD and evidenced by documentary evidence that can include but is not limited to site visits performed or photographic evidence taken or confirmation by a competent authority of the DPR Korea such as the Ministry of Land and Environment Protection or other competent authority.

13. Criterion: If the final sludge is not used for soil application in the baseline scenario and project scenario, then a CPA shall only be implemented at sites where the final sludge is disposed at a solid waste disposal site with a water table above the bottom of the solid waste disposal site in both the baseline and the project scenario.
Evidence: Disposal records for final sludge in the baseline scenario and project scenario. Documentary evidence can include but is not limited to site visits performed or photographic evidence taken (with time stamps) or contractual agreements entered into by the CPA owner or CME for the disposal of the sludge and/or letter from a competent authority confirming the final sludge disposal site.

A.4.3. Description of how the anthropogenic emissions of GHG by sources are reduced by a SSC-CPA below those that would have occurred in the absence of the registered PoA (assessment and demonstration of additionality):

>> The following shall be demonstrated here:

(i) The proposed PoA is a voluntary coordinated action;
The PoA is developed and financed by Carbon Development and Trading Ltd the coordinating/managing entity (CME). Carbon Development and Trading Ltd undertakes this development on a voluntary basis as evidenced by a letter issued by Carbon Development and Trading Ltd.

(ii) If the PoA is implementing a voluntary coordinated action, it would not be implemented in the absence of the PoA;
The current business as usual activity is the release of methane from industrial wastewater into the atmosphere without capture and utilisation or destruction. There are no laws in the DPR Korea requiring the operators of industrial wastewater facilities to utilise or capture methane. Given the lack of investment capital available in the DPR Korea, the CPAs would not happen in the absence of CDM revenue that could accrue to the coordinating/managing entity (CME). The DPR Korea currently has no plans to implement legislation for the capture and utilisation of methane from industrial wastewater.

The PoA improves the current practise and introduces efficiency measures to the DPR Korea that also support global climate change mitigation action.

The additionality of each individual CPA will be demonstrated as per Section E.5.1.

(iii) If the PoA is implementing a mandatory policy/regulation, this would/is not enforced;
The DPR Korea has industrial wastewater discharge standards in accordance with the environmental protection law 1986. The implementation of the PoA will lead to CPAs complying with wastewater discharge standards that the industrial wastewater facilities currently do not comply with. The DPR wastewater discharge standards in accordance with the environmental protection law 1986 do not specify that methane resulting from the industrial wastewater facilities has to be captured. The wastewater discharge standards are not currently enforced by the Ministry of Land and Environment Protection.

(iv) If mandatory a policy/regulation is enforced, the PoA will lead to a greater level of enforcement of the existing mandatory policy/regulation.
The policy in the DPR Korea is not enforced as evidenced in paragraph (iii) above.

A.4.4. Operational, management and monitoring plan for the programme of activities (PoA):

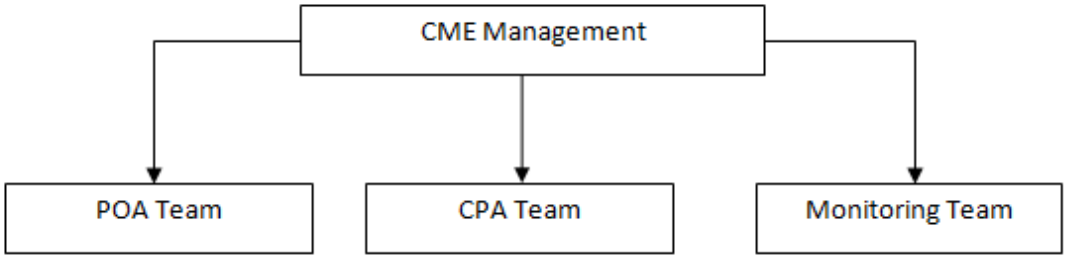
A.4.4.1. Operational and management plan:

>> Description of the operational and management arrangements established by the coordinating/managing entity for the implementation of the PoA, including:

The coordinating/managing entity (CME) is responsible for the coordination of all project participants of the PoA, collecting necessary data and information from each CPA for the purpose of establishing the

economic and technical feasibility of each CPA, to prepare the CPA-DD, and to ensure that monitoring at each CPA site can be performed. The CME is also responsible for all communications with the DOE and CDM Executive Board.

The CME will operate several teams as outlined below:



CME shall perform the following tasks:

- Identifying new potential CPAs;
- Checking whether potential CPAs fulfil the eligibility criteria;
- Liaising with the GBCIO and CPA owners to obtain necessary information and documentation in order to include the CPA in the PoA;
- Maintaining the PoA database to ensure that no double-counting exists;
- Implementing the CPAs in order to achieve emission reductions;
- Liaising with the DOE to include CPAs in the PoA;
- Preparing monitoring reports;
- Liaising with the DOE for verification of the monitored data.

Responsibilities of CME:

- CME shall work in accordance with the relevant rules and decisions of the CDM Executive Board;
- CME shall work in a transparent way and provide accurate information;
- CME shall instruct a DOE that has appropriate skill and knowledge to validate the PoA and individual CPAs;
- CME shall instruct a DOE that has appropriate skill and knowledge to verify emission reductions resulting from the implementation of CPAs.

The CME's PoA Team is responsible for the PoA overall including the identification of new CPAs and to establish the financial and technical feasibility of a CPA. This team will also maintain the PoA database.

The CME's CPA Team is responsible for the preparation of the CPA-DD and to assess each CPA's eligibility against the criteria outlined in the PoA-DD. Before seeking to include a CPA into the PoA, the team shall check that the CPA fulfils all eligibility criteria as set out in section A.4.2.2. of this PoA-DD and shall only seek to include such CPA if all criteria are met by the CPA. The team will also ensure that the CPA seeking to be included is not already included in the PoA.

The CME's Monitoring Team is responsible for the collection of the monitoring data from the CPA owner and for the calculation of emissions reductions for each CPA, as well as the preparation of monitoring reports. The CME's Monitoring Team shall liaise with a DOE for the verification for the achieved emission reductions from each CPA.

Each CPA is operated by a CPA owner that regularly reports monitored data to the CME's Monitoring Team. The CPA owner will appoint a person dedicated to ensure that monitoring equipment is maintained and operational in accordance with manufacturer specifications. This person will also be tasked to ensure that data is collected in accordance to the monitoring procedures required to ensure accurate and timely data collection for all required parameters in accordance with the monitoring methodology.

(i) A record keeping system for each CPA under the PoA:
The record keeping system includes, but is not limited to, a database that lists all CPAs, the CPA's unique identification number, name and location of the CPA, size of each CPA, installed equipment, name of the company responsible for the CPA and all necessary data relating to the industrial wastewater facility at each CPA site. The database will be maintained by the CME with information provided by each CPA owner. The CME verifies the reported data with field checks if necessary

The CME's Monitoring Team collects all monitoring data from the CPA operated and will keep those records in accordance with the monitoring methodology. All data will be archived in accordance with the requirements set out in the monitoring methodology.

(ii) A system/procedure to avoid double counting e.g. to avoid the case of including a new CPA that has been already registered either as CDM project activity or as a CPA of another PoA:
Before seeking to include a CPA in the PoA, the CME's CPA Team shall obtain a letter from the CPA owner confirming that the CPA is not already registered as a CDM project activity or a CPA of another PoA. Additionally, the CME's CPA Team will consult the CDM Project Database to ensure that the CPA is not already a registered CDM project or included in another PoA. Each CPA shall have a unique identification number and unique geographical reference.

(iii) The SSC-CPA included in the PoA is not a de-bundled component of another CDM programme activity (CPA) or CDM project activity.
Each CPA owner, in accordance with the eligibility criteria set out in section 4.2.2, confirms in writing at the time of CPA inclusion that it does not belong to any other PoA or other registered CDM Project. Additionally, the CME will follow the "Guidance for determining the occurrence of de-bundling under a Programme of Activity" to ensure that the proposed CPA is not a de-bundled component of a large scale activity.

(iv) The provisions to ensure that those operating the CPA are aware of and have agreed that their activity is being subscribed to the PoA;
Each CPA owner, in accordance with the eligibility criteria set out in section 4.2.2, confirms in writing at the time of CPA inclusion that it is aware and has agreed to be included in the PoA on a voluntary basis.

(v) Roles and responsibilities of personnel involved in the process of inclusion of CPAs:
The CPA inclusion tasks rests with the CME's CPA Team. The CME Management shall appoint a person to be the team leader. The team leader at his/her discretion may request additional people to join his team in order to ensure that sufficient resources are available to the team leader to perform his/her duties on behalf of the CME.

The CPA Team leader shall demonstrate the following competencies:

- Clear understanding of CDM modalities and protocol;
- Clear understanding of the eligibility criteria of the PoA;
- Ability to scrutinise all project related documents;
- At least one year work experience in the carbon market and/or emission reduction project development;

- Education to university degree level;
- Demonstrate fluency in English.

The team leader shall assign individual members of his teams to particular tasks while retaining responsibility for the performance of the tasks under his/her leadership. The team leader shall make a recommendation to the CME's management as to whether to include a CPA in the PoA

The management of the CME shall ensure that the team leader meets the competency criteria set out above.

(vi) Records of arrangements for training and capacity development for personnel:
The CME will provide training to its employees as required to perform the assigned tasks with appropriate skill and care. The extent of the training to be provided is going to be dependent on the individual employee. If consultants are engaged in order to perform a particular task, the consultant shall be able to demonstrate that it has the required competencies.

(vii) Procedure for technical review of inclusion of CPAs:
Before seeking to include a CPA in the POA, the CME will review the eligibility criteria as set out in the PoA-DD for inclusion of a CPA in the PoA and establish that all eligibility criteria are fulfilled by the CPA seeking to be included in the PoA. The person assigned for this task shall produce documentary evidence in order to ensure that the eligibility criteria have been fulfilled and can be verified by a DOE.

During the technical review, the CPA Team will ensure that the fulfilment of all eligibility criteria is evidenced as outlined in the POA-DD and ensure that the CPA-DD conforms with latest CDM Executive Board guidelines.

Once the CME's CPA Team is satisfied that the eligibility criteria are met by the CPA, it should recommend inclusion of the CPA to the CME Management. Subject to approval from the CME Management, the CME's Management shall instruct a DOE to include the CPA in the PoA. In the process of inclusion, the DOE will again check that all eligibility criteria are satisfied and that the CPA can be included in the PoA.

(vii) Measures for continuous improvements of the PoA management system;
The CME strives to continuously improve the PoA management system. The CME will follow guidance issued by the CDM Executive Board and other entities involved in the carbon market in order to adhere to the latest standards for PoA management systems.

A.4.4.2. Monitoring plan:

>> The following information shall be provided here:

(i) Description of the proposed statistically sound sampling method/procedure to be used by DOEs for verification of the amount of reductions of anthropogenic emissions by sources or removals by sinks of greenhouse gases achieved by CPAs under the PoA.

The CPAs will not use a statistically sound sampling method or procedure to be used by DOEs. All data required for verification of the amount of anthropogenic emissions by source is provided by the CPAs in the PoA through the coordinating/managing entity to the DOE.

(ii) In case the coordinating/managing entity opts for a verification method that does not use sampling but verifies each CPA (whether in groups or not, with different or identical verification periods) a transparent system is to be defined and described that ensures that no double accounting occurs and that the status of verification can be determined anytime for each CPA.

According to the Procedures for Registration of a Programme of Activities as a Single CDM Project Activity and issuance of Certified Emission Reductions for a Programme of Activities (version 04.1), all CPAs in the PoA will be monitored according to the applicable methodology, procedures and guidelines.

All relevant parameters included in the monitoring plan for each CPA shall be monitored and recorded for each CPA independently. Monitoring reports for each CPA will be drawn up for verification purposes and for the request for issuance of CERs. The coordinating/managing entity will act as a central point for data collection and archiving to ensure accessibility of the data.

A.4.5. Public funding of the programme of activities (PoA):

>>
No public funding is provided for the PoA or any of the CPAs included in the PoA from an Annex I Party.

SECTION B. Duration of the programme of activities (PoA)

B.1. Starting date of the programme of activities (PoA):

>>Starting date of the proposed PoA: 22/01/2012 (the date of publication of the PoA-DD for global stakeholder consultation)

B.2. Length of the programme of activities (PoA):

>>
The length of the PoA is 28 years.

SECTION C. Environmental Analysis

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C.1. Please indicate the level at which environmental analysis as per requirements of the CDM modalities and procedures is undertaken. Justify the choice of level at which the environmental analysis is undertaken:

1. Environmental Analysis is done at PoA level ☐
2. Environmental Analysis is done at SSC-CPA level ☒

As each CPAs has a choice of technology/measure to be implemented in line with individual CPA feasibility, it is appropriate for each CPA to perform its own environmental analysis to take account of the unique features of each CPA.

C.2. Documentation on the analysis of the environmental impacts, including transboundary impacts:

>>

The analysis of environmental impacts will be performed and documented on the CPA level in order to ensure that proper account of environmental impacts associated with each CPA can be taken.

C.3. Please state whether in accordance with the host Party laws/regulations, an environmental impact assessment is required for a typical CPA, included in the programme of activities (PoA),:

>>

In accordance with host Party laws and regulations, it is unlikely that an environmental impact assessment will be required for a typical CPA. The requirement of an environmental impact assessment will be evaluated for each CPA. The CME will commission an environmental impact assessment if required by the host Party.

SECTION D. Stakeholders' comments

>>

D.1. Please indicate the level at which local stakeholder comments are invited. Justify the choice:

1. Local stakeholder consultation is done at PoA level ☐
2. Local stakeholder consultation is done at SSC-CPA level ☒

Note: If local stakeholder comments are invited at the PoA level, include information on how comments by local stakeholders were invited, a summary of the comments received and how due account was taken of any comments received, as applicable.

As the PoA covers the entire territory of the DPR Korea, the stakeholder consultation is performed on a CPA level in order to ensure that comments from locally affected people can be taken into consideration.

D.2. Brief description how comments by local stakeholders have been invited and compiled:

>>

Not applicable. The stakeholder consultation is done on the CPA level.

D.3. Summary of the comments received:

>>

Not applicable. The stakeholder consultation is done on the CPA level.

D.4. Report on how due account was taken of any comments received:

>>

Not applicable. The stakeholder consultation is done on the CPA level.

SECTION E. Application of a baseline and monitoring methodology

This section shall demonstrate the application of the baseline and monitoring methodology to a typical SSC-CPA. The information defines the PoA specific elements that shall be included in preparing the PoA specific form used to define and include a SSC-CPA in this PoA (PoA specific CDM-SSC-CPA-DD).

E.1. Title and reference of the approved SSC baseline and monitoring methodology applied to a SSC-CPA included in the PoA:

>>

NOTE: The approved SSC baseline and monitoring methodology should be approved for use in a PoA by the Board.

The PoA will use the Approved SSC Methodology AMS-III.H. (Version 16) "Methane recovery in wastewater treatment" Each CPA will follow this methodology.

In accordance with Approved Methodology AMS-III.H. (Version 16) the following tools will also be used:

1. "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" (Version 02)
2. "Emissions from solid waste disposal sites" (Version 06.1.0)
3. "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (Version 01)
4. "Project emissions from flaring" (Version 02.0.0)
5. "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (Version 02.0.0)

E.2. Justification of the choice of the methodology and why it is applicable to a SSC-CPA:

>>

NOTE: In the case of CPAs which individually do not exceed the SSC threshold, SSC methodologies may be used once they have first been reviewed and, as needed, revised to account for leakage in the context of a SSC-CPA.

The Approved SSC Methodology AMS-III.H. (Version 16) "Methane recovery in wastewater treatment" states the applicability criteria. Below is a comparison between the applicability criteria set out by the Approved SSC Methodology AMS-III.H. (Version 16) and the CPAs:

Table 1: Applicability of Approved SSC Methodology AMS-III.H. to each CPA

Applicability to wastewater treatment technology/measure:	
Substitution of aerobic wastewater or sludge treatment systems with anaerobic systems with biogas recovery and combustion.	Included. CPAs shall use one or a combination of the 6 measures listed in methodology AMS-III.H. (Version 16) to ensure that the PoA can achieve its goal of maximum methane avoidance to the atmosphere.

Introduction of anaerobic sludge treatment system with biogas recovery and combustion to a wastewater treatment plant without sludge treatment.	Included. CPAs shall use one or a combination of the 6 measures listed in methodology AMS-III.H. (Version 16) to ensure that the PoA can achieve its goal of maximum methane avoidance to the atmosphere.
Introduction of biogas recovery and combustion to a sludge treatment system.	Included. CPAs shall use one or a combination of the 6 measures listed in methodology AMS-III.H. (Version 16) to ensure that the PoA can achieve its goal of maximum methane avoidance to the atmosphere.
Introduction of biogas recovery and combustion to an anaerobic wastewater treatment system such as anaerobic reactor, lagoon, septic tank or an on-site industrial plant.	Included. CPAs shall use one or a combination of the 6 measures listed in methodology AMS-III.H. (Version 16) to ensure that the PoA can achieve its goal of maximum methane avoidance to the atmosphere.
Introduction of anaerobic wastewater treatment with biogas recovery and combustion, with or without anaerobic sludge treatment, to an untreated wastewater stream.	Included. CPAs shall use one or a combination of the 6 measures listed in methodology AMS-III.H. (Version 16) to ensure that the PoA can achieve its goal of maximum methane avoidance to the atmosphere.
Introduction of a sequential stage of wastewater treatment with biogas recovery and combustion, with or without sludge treatment, to an anaerobic wastewater treatment system without biogas recovery (e.g. introduction of treatment in an anaerobic reactor with biogas recovery as a sequential treatment step for the wastewater that is presently being treated in an anaerobic lagoon without methane recovery).	Included. CPAs shall use one or a combination of the 6 measures listed in methodology AMS-III.H. (Version 16) to ensure that the PoA can achieve its goal of maximum methane avoidance to the atmosphere.

Applicability to anaerobic wastewater lagoons:	
The lagoons are ponds with a depth greater than two meters, without aeration. The value for depth is obtained from engineering design documents, or through direct measurement, or by dividing the surface area by the total volume. If the lagoon filling level varies seasonally, the average of the highest and lowest levels may be taken.	Included. Anaerobic lagoons are the common practise for wastewater treatment in the DPR Korea at present. The CME shall ensure that all CPAs comply with methodological requirements regarding anaerobic ponds.
Ambient temperature above 15°C, at least during part of the year, on a monthly average basis.	Included. The CME shall ensure that all CPAs comply with methodological requirements regarding the ambient temperature.
The minimum interval between two consecutive sludge removal events shall be 30 days.	Included. The CME shall ensure that all CPAs comply with methodological requirements regarding sludge removal intervals.

Applicability to use of recovered biogas:	
Thermal or mechanical, electrical energy generation directly.	Included. Each CPA shall only involves facilities to destroy methane through flaring and/or utilize the methane for heat and/or electricity generation

	directly. Each CPA shall have the option to utilize or destroy the methane depending on each site specification and requirement. A CPA shall not claim emission reductions under a Type I methodology.
Thermal or mechanical, electrical energy generation after bottling of upgraded biogas	Excluded. Each CPA shall only involves facilities to destroy methane through flaring and/or utilize the methane for heat and/or electricity generation directly
Thermal or mechanical, electrical energy generation after upgrading and distribution	Excluded. Each CPA shall only involves facilities to destroy methane through flaring and/or utilize the methane for heat and/or electricity generation directly
Hydrogen production	Excluded. Each CPA shall only involves facilities to destroy methane through flaring and/or utilize the methane for heat and/or electricity generation directly.
Use as fuel in transportation applications after upgrading	Excluded. Each CPA shall only involves facilities to destroy methane through flaring and/or utilize the methane for heat and/or electricity generation directly.

Applicability to other criteria:	
New facilities (Greenfield projects) and project activities involving a change of equipment resulting in a capacity addition of the wastewater or sludge treatment system compared to the designed capacity of the baseline treatment system are only eligible to apply this methodology if they comply with the relevant requirements in the "General guidelines to SSC CDM methodologies". In addition the requirements for demonstrating the remaining lifetime of the equipment replaced, as described in the general guidelines shall be followed	Included. The CME shall ensure that all CPAs comply with methodological requirements regarding new facilities and capacity addition projects.
The location of the wastewater treatment plant as well as the source generating the wastewater shall be uniquely defined and described in the PDD	Included. The location of each CPA shall be identified with a map, GPS coordinates and location description. The CME shall ensure that each CPA is uniquely identified as described.
Aggregate emissions reductions of less than or equal to 60 kt CO_2 equivalent annually	Included. The CME shall ensure that each CPA complies with this criteria and shall only seek to include CPAs with aggregate emission reductions of less than 60kt Co2 equivalent annually.

E.3. Description of the sources and gases included in the SSC-CPA boundary

>>

In accordance with Approved SSC Methodology AMS-III.H. (Version 16) "Methane recovery in wastewater treatment", the project boundary is the physical, geographical site where the wastewater and sludge treatment takes place, in the baseline and project situations. It covers all facilities affected by the project activity including sites where processing, transportation and application or disposal of waste products as well as biogas takes place.

Implementation of the project activity at a wastewater and/or sludge treatment system will affect certain sections of the treatment systems while others may remain unaffected. The treatment systems not affected by the project activity, i.e. sections operating in the project scenario under the same operational conditions as in the baseline scenario (e.g. wastewater inflow and COD content, temperature, retention time, etc.), shall be described in the PDD, but emissions from those sections do not have to be accounted for in the baseline and project emission calculations (since the same emissions would occur in both baseline and project scenarios). The assessment and identification of the systems affected by the project activity will be undertaken *ex ante*, and the PDD shall justify the exclusion of sections or components of the system. The treatment systems (lagoons, reactors, digesters, etc.) that will be covered and/or equipped with biogas recovery by the project activity, but continue to operate with the same quality of feed inflow, volume (retention time), and temperature (heating) as in the baseline scenario, may be considered as not affected i.e. the methane generation potential remains unaltered.

Table 2: Overview on emissions sources included in or excluded from the project boundary

	Source	Gas		Justification / Explanation
Baseline	Emissions from electricity or fuel consumption in the baseline scenario	CO_2	Included	The main source of emissions from electricity consumption or fuel use in the baseline.
		CH4	Excluded	Excluded for simplification.
		N_2O	Excluded	Excluded for simplification.
	Emissions from the baseline wastewater treatment system	CO_2	Excluded	CO_2 emissions from the decomposition of organic waste are not accounted for
		CH_4	Included	The major source of emissions from the wastewater treatment system due to decomposition of organic matter.
		N_2O	Excluded	Excluded for simplification.
	Emissions from the baseline sludge treatment system	CO_2	Excluded	CO_2 emissions from the decomposition of organic waste are not accounted for
		CH_4	Included	The major source of emissions from the wastewater treatment system due to decomposition of organic matter.
		N_2O	Excluded	Excluded for simplification.
	Emissions from the discharge of effluent into river/lake/sea	CO_2	Excluded	CO_2 emissions from the decomposition of organic waste are not accounted for
		CH_4	Included	The major source of emissions from the effluent due to decomposition of organic matter.
		N_2O	Excluded	Excluded for simplification.
	Emission from anaerobic decay of the final sludge	CO_2	Excluded	CO_2 emissions from the decomposition of organic waste are not accounted for
		CH_4	Included	The major source of emissions from the effluent due to decomposition of organic matter.
		N_2O	Excluded	Excluded for simplification.
Project Activity	Emissions from electricity or fuel consumption in the project activity	CO_2	Included	The main source of emissions from electricity consumption or fuel use in the project activity.
		CH_4	Excluded	Excluded for simplification.
		N_2O	Excluded	Excluded for simplification.
	Emissions from the project wastewater treatment system	CO_2	Excluded	CO_2 emissions from the decomposition of organic waste are not accounted for
		CH_4	Included	The major source of emissions from the wastewater treatment system due to decomposition of organic matter.
		N_2O	Excluded	Excluded for simplification.
	Emissions from the project sludge treatment system	CO_2	Excluded	CO_2 emissions from the decomposition of organic waste are not accounted for
		CH_4	Included	The major source of emissions from the wastewater treatment system due to decomposition of organic matter.
		N_2O	Excluded	Excluded for simplification.
	Emissions from the discharge of	CO_2	Excluded	CO_2 emissions from the decomposition of organic waste are not accounted for

	Source	Gas		Justification / Explanation
	effluent into river/lake/sea	CH_4	Included	The major source of emissions from the effluent due to decomposition of organic matter.
		N_2O	Excluded	Excluded for simplification.
	Emission from anaerobic decay of the final sludge	CO_2	Excluded	CO_2 emissions from the decomposition of organic waste are not accounted for
		CH_4	Included	The major source of emissions from the effluent due to decomposition of organic matter.
		N_2O	Excluded	Excluded for simplification.
	Emission from fugitive emissions	CO_2	Excluded	CO_2 emissions from the decomposition of organic waste are not accounted for
		CH_4	Included	The major source of emissions from inefficiencies in the biogas capture system.
		N_2O	Excluded	Excluded for simplification.
	Emission from biomass storage under anaerobic conditions	CO_2	Excluded	CO_2 emissions from the decomposition of organic waste are not accounted for
		CH_4	Included	The major source of emissions from the effluent due to decomposition of organic matter.
		N_2O	Excluded	Excluded for simplification.
	Emissions from incomplete flaring of biogas	CO_2	Excluded	Excluded for simplification
		CH_4	Included	The major source of emissions from the incomplete flaring of biogas
		N_2O	Excluded	Excluded for simplification.

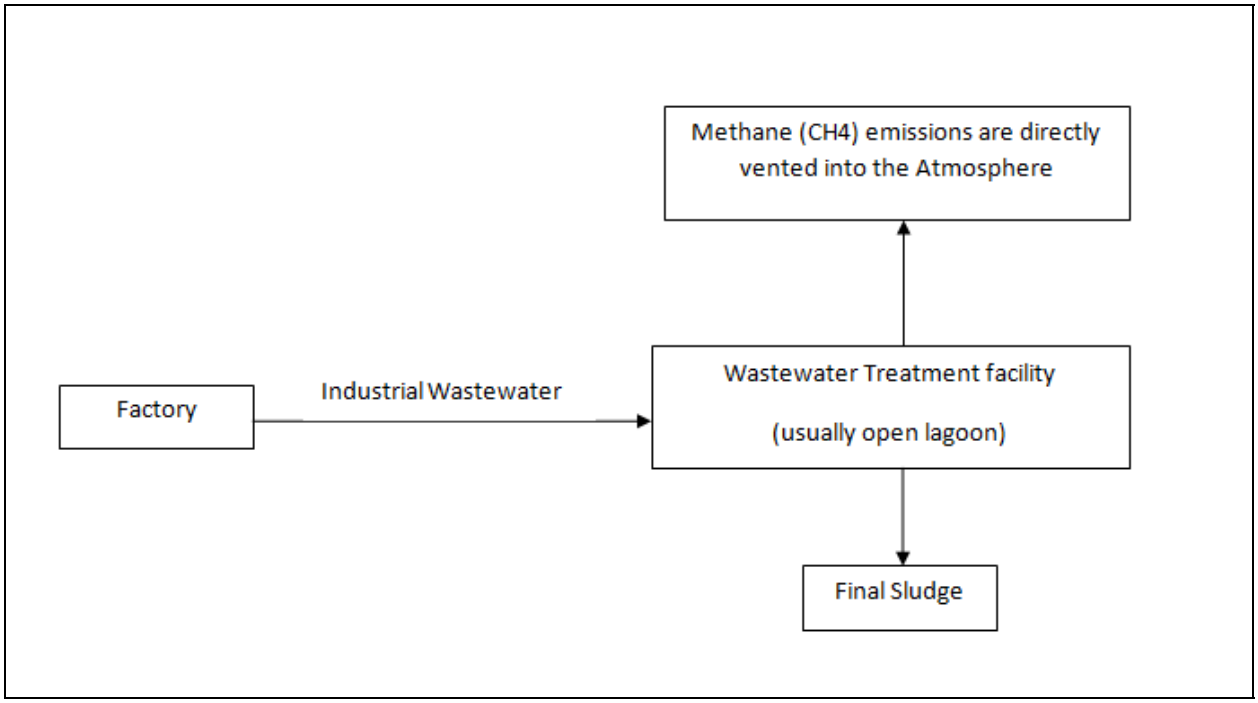
E.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

>>

The baseline scenario for a typical CPA is the venting of all methane resulting from a industrial wastewater treatment system into the Atmosphere. This has been confirmed by the Ministry of Land and Environment Protection in its letter dated 27/01/2012 as the common practise of industrial wastewater treatment facilities in the DPR Korea.

The baseline scenario for a typical CPA is illustrated in Figure 2 below. It represents the current practise that industrial wastewater is moved to an industrial wastewater facility, generally open lagoons, where methane is simple vented into the atmosphere.

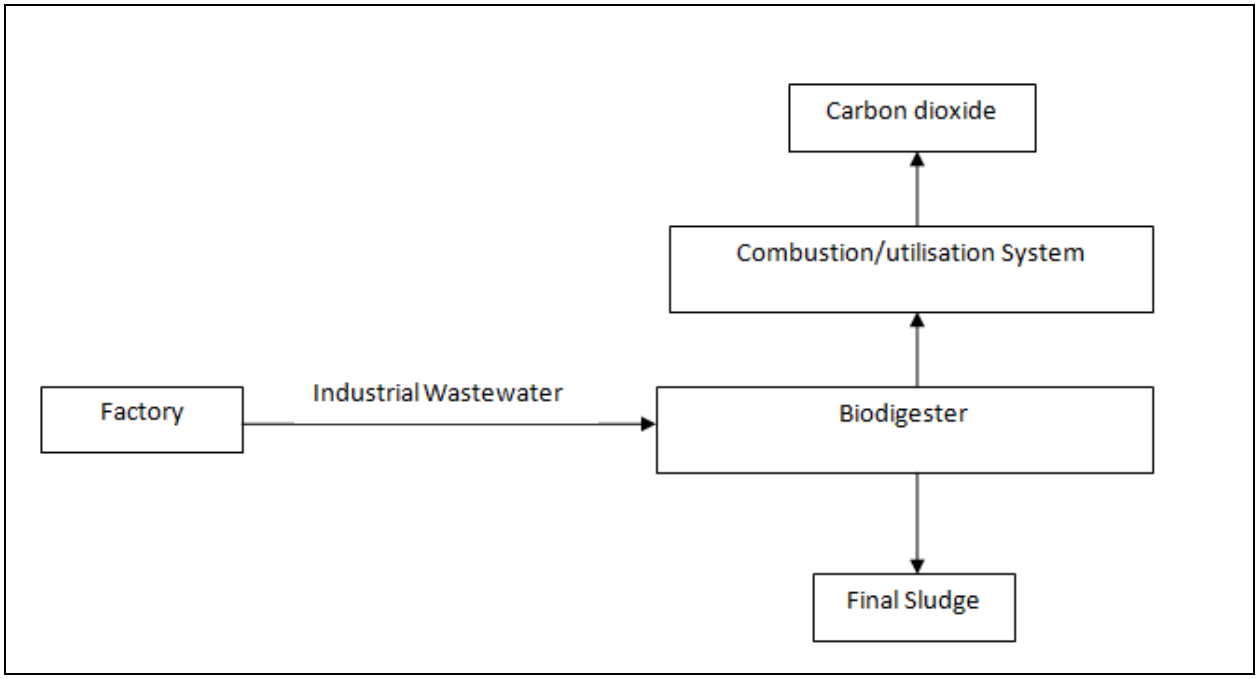
Figure 2: Baseline Scenario:



This baseline scenario represents the common practise in the DPR Korea at present. The reason for this is the low levels of management required to treat the wastewater and the low investment costs for doing so.

The project scenario for a typical CPA would alter the baseline scenario in that it would capture the methane generated from industrial wastewater and either destroy the methane through combustion or utilise the methane for further uses.

Figure 3: Project Scenario:



E.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the SSC-CPA being included as registered PoA (assessment and demonstration of additionality of SSC-CPA): >>

E.5.1. Assessment and demonstration of additionality for a typical SSC-CPA:

>> Here the PPs shall demonstrate, using the procedure provided in the baseline and monitoring methodology applied, additionality of a typical CPA.

As the coordinating/managing entity (CME) is only entitled to a share of the CDM Revenue from the successful implementation of CPAs in return for developing and implementing the PoA, the PoA would not be undertaken by the CME in case that CDM Revenue was not forthcoming.

In order to demonstrate the additionality on a CPA-level, the CME shall establish whether a CPA is additional by demonstrating that the CPA would not have occurred due to at least one of the following barriers in accordance with the "Guidelines on the demonstration of additionality of small-scale project activities" (Version 09.0):

(i) Investment barrier:
A financially more viable alternative to the project activity would have led to higher emissions.

(ii) Technological barrier:
a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions;.

(iii) Barrier due to prevailing practice:
Prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions.

(iv) Other barriers:
without the project activity, for another specific reason identified by the project participant, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher.

E.5.2. Key criteria and data for assessing additionality of a SSC-CPA:

>> Here the PPs shall provide the key criteria for assessing additionality of a CPA when proposed to be included in the registered PoA. The criteria shall be based on additionality assessment undertaken in E.5.1 above. The project participants shall justify the choice of criteria based on analysis in above section. It shall be demonstrated how these criteria would be applied to assess the additionality of a typical CPA at the time of inclusion.

To demonstrate that a CPA seeking to be included in the PoA is additional, the CME shall use the following key criteria to assess the additionality of the CPA before inclusion of the CPA in the PoA:

As outlined in this PoA-DD, the CME is required to finance the investment of the PoA and CPAs included in the PoA from its own funds. The DPR Korea has confirmed that it will not provide finance for the development or implementation of the CPAs. To demonstrate that a CPA would not occur due to an investment barrier, a CPA has to demonstrate that the following criteria are met by the CPA:

(i) That there is no legal requirement that is enforced for the CPA to be implemented; and
(ii) That there are no benefits to the CME besides CDM Revenue; and
(iii) That the CME will have to provide all capital for the implementation of the CPA and that such business framework for the implementation of CDM Programmes of Activities in the DPR Korea is equally applicable to all foreign investors.

If these criteria are met, then the CPA shall be able to demonstrate its additionality by using the simple cost analysis method. The CPA shall then demonstrate that a financially more viable alternative to the project would have led to higher emissions.

E.6. Estimation of Emission reductions of a CPA:

Emission reductions of each CPA will be estimated in accordance with Approved SSC Methodology AMS-III.H. (Version 16) “Methane recovery in wastewater treatment”.

E.6.1. Explanation of methodological choices, provided in the approved baseline and monitoring methodology applied, selected for a typical SSC-CPA:

>>

In accordance with Approved Methodology AMS-III.H. (Version 16) the following tools will be used:

1. "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" (Version 02);
2. "Emissions from solid waste disposal sites" (Version 06.1.0);

3. "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (Version 01);
4. "Project emissions from flaring" (Version 02.0.0);
5. "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (Version 02.0.0).

In order to determine the baseline and project emissions from fuel consumption, the methodological tool "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" (Version 02) shall be used. Each CPA shall choose Option A of the methodological tool for the calculation of the parameter $PE_{FC,i,y}$.

The methodological tool "Emission from solid waste disposal sites" (Version 06.1.0) provides a procedure for estimating the methane correction factor of the site that receives the final sludge in the baseline scenario and the project scenario. A CPA represents an "Application B" under the methodological tool as it is a CDM project activity that avoids or involves the disposal of waste at a solid waste disposal site. CPAs shall only be implemented at sites where the final sludge is disposed at a solid waste disposal site with a water table above the bottom of the solid waste disposal site in both the baseline and the project scenario. Therefore, the default value provided by the methodological tool will be used. If the final sludge is used for soil application in the baseline scenario, then the methodological tool will not be used as the parameter $BE_{s,final,y}$ can be neglected in accordance with Approved SSC Methodology AMS-III.H. (Version 16). If the final sludge is used for soil application in the project scenario then the methodological tool will not be used as the parameter $PE_{s,final,}$ can be neglected in accordance with Approved SSC Methodology AMS-III.H. (Version 16).

In order to determine the baseline and project emissions from electricity consumption, the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (Version 01) shall be used. If a CPA is implemented at an industrial installations in the DPR Korea that gets its electricity supply from the grid, then Scenario A is applicable for this tool. Option A2 shall be used for the CPA. If a CPA is implemented at an industrial installations in the DPR Korea that gets its electricity supply from an off-grid fossil fuel fired captive power plant, then Scenario B is applicable for this tool. Option B2 shall be used for the CPA. If a CPA is implemented at an industrial installations in the DPR Korea that gets its electricity supply both from the grid and from an off-grid fossil fuelled fired captive power plant, then Scenario C is applicable for this tool.

The "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (Version 01) provides default values for $TDL_{j,y}$ and $TDL_{k,y}$. CPAs shall used a default value of 0 in case of scenario B, and scenario C.II of the methodological tool. CPAs shall use a default value of 20% of 3% in accordance with the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (Version 01) as applicable to the particular CPA in scenario A and scenario C, cases C.I and C.III.

Flares installed at CPA sites will be enclosed flares. In order to determine the flare efficiency, the flare efficiency will be measured in accordance with Option B.1 of the Methodological tool "Project emissions from flaring" (Version 02.0.0). The flare efficiency will be measured bi-annually. In accordance with the above named tool, the following steps will be performed:

STEP 1: Determination of the methane mass flow in the residual gas;
STEP 2: Determination of the flare efficiency;
STEP 3: Calculation of project emissions from flaring.

Mass flow of methane in the residual gas in minute *m* ($F_{CH4,RG,m}$) is calculated using the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (Version 02.0.0).

According to the methodological tool "Project emissions from flaring" (Version 02.0.0), the parameter $F_{CH4,RG,m}$ shall be determined as the mass flow during minute m and shall be measured on a dry basis. This represents Option D of Table 1 of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (Version 02.0.0). Under this option, each CPA shall demonstrate that the temperature of the gaseous stream (T_m) is less than 60°C (333.15 K) at the flow measurement point.

The methodology requires some parameters including COD content of the wastewater at the point of inflow and outflow to be sampled on a 90/10 level of precision. The measurement of the parameters will be taken in field measurements on a monthly basis or more frequent if required. In order to ensure that the field measurements are correct, additional samples will be analysed by an independent laboratory on an annual basis. The sampling procedure will be in accordance with specifications by the laboratory and supplier of the field measuring device.

Provisions regarding the revisions of the CPA in case the methodology is put on hold or withdrawn:

- If the approved methodology is put on hold or withdrawn for any reason other than for the purpose of inclusion in a consolidated methodology, no new CPAs shall be included in the PoA.
- If the methodology is subsequently revised or replace by inclusion in a consolidated methodology, the PoA shall be revised accordingly and the changes shall be validated by a DOE and approved by the CDM Executive Board (CDM EB) if a new CPA is to be included. The CDM EB's approval defines a new version of the PoA-DD and the PoA specific CDM-CPA-DD
- Once changes have been approved by the CDM EB, each new CPA shall use the latest version of the PoA.
- CPAs that were included before the methodology was put on hold, shall apply the latest version of the PoA specific CDM-CPA-DD at the time of the renewable of the crediting period.

Provisions regarding the methodology implementation in the 2nd and 3rd crediting periods:

- The baseline scenario shall be re-assed during the renewal of each crediting period. If changes in regulation regarding the destruction of methane from industrial wastewater facilities in the DPR Korea have occurred, then the baseline emissions shall be re-estimated.

E.6.2. Equations, including fixed parametric values, to be used for calculation of emission reductions of a SSC-CPA:

>>

EQUATIONS TO BE USED FOR CALCULATION OF EMISSION REDUCTIONS OF A CPA:

Please note that definitions provided to individual parameters continue to be applicable in equations subsequent to the equation in which the definition was provided unless newly defined in an equation.

Baseline

1. Wastewater and sludge treatment systems equipped with a biogas recovery facility in the baseline shall be excluded from the baseline emission calculations.

2. Baseline emissions for the systems affected by the project activity may consist of:

   (i) Emissions on account of electricity or fossil fuel used ($BE_{power,y}$);

   (ii) Methane emissions from baseline wastewater treatment systems ($BE_{ww,treatment,y}$);

   (iii) Methane emissions from baseline sludge treatment systems ($BE_{s,treatment,y}$);

(iv) Methane emissions on account of inefficiencies in the baseline wastewater treatment systems and presence of degradable organic carbon in the treated wastewater discharged into river/lake/sea ($BE_{ww,discharge,y}$);

(v) Methane emissions from the decay of the final sludge generated by the baseline treatment systems ($BE_{s,final,y}$).

$$BE_y = \{BE_{power,y} + BE_{ww,treatment,y} + BE_{s,treatment,y} + BE_{ww,discharge,y} + BE_{s,final,y}\} \quad \textbf{(1)}$$

Where:

BE_y	Baseline emissions in year y (tCO_2e)
$BE_{power,y}$	Baseline emissions from electricity or fuel consumption in year y (tCO_2e)
$BE_{ww,treatment,y}$	Baseline emissions of the wastewater treatment systems affected by the project activity in year y (tCO_2e)
$BE_{s,treatment,y}$	Baseline emissions of the sludge treatment systems affected by the project activity in year y (tCO_2e)
$BE_{ww,discharge,y}$	Baseline methane emissions from degradable organic carbon in treated wastewater discharged into sea/river/lake in year y (tCO_2e).
$BE_{s,final,y}$	Baseline methane emissions from anaerobic decay of the final sludge produced in year y (tCO_2e). If the sludge is controlled combusted, disposed in a landfill with biogas recovery, or used for soil application in the baseline scenario, this term shall be neglected

3. Baseline emissions from electricity and fossil fuel consumption (BEpower,y) are calculated as follows:

$$BE_{power,y} = BE_{EC,y} + BE_{FC,j,y} \quad \textbf{(2)}$$

Where:

$BE_{power,y}$ = Baseline emissions from electricity or fuel consumption in year y (tCO_2e)
$BE_{EC,y}$ = Baseline emissions from electricity consumption in year y (tCO_2e)
$BE_{FC,j,y}$ = Baseline emissions from fossil fuel combustion in process j during the year y (tCO_2e)

$$BE_{EC,y} = \sum_k \{EC_{BL,k,y} * EF_{EL,k,y} * (1 + TDL_{k,y})\} \quad \textbf{(3)}$$

Where:

$EC_{BL,k,y}$ = Quantity of electricity that would be consumed by the baseline electricity consumption source k during the year y (MWh)
$EF_{EL,k,y}$ = Emission factor for electricity generation for source k during the year y (tCO_2/MWh)
$TDL_{k,y}$ = Average technical transmission and distribution losses for providing electricity to source k during the year y
k = Sources of electricity consumption in the baseline scenario

$$BE_{FC,j,y} = \sum_i (FC_{i,j,y} * COEF_{i,y}) \quad \textbf{(4)}$$

Where:

$FC_{i,j,y}$ = Quantity of fuel type i combusted in process j during the year y (mass or volume unit)

$COEF_{i,y}$ = CO_2 emissions coefficient of fuel type *i* during the year *y* (tCO_2/mass or volume unit)
i = Are the fuel types combusted in process *j* during the year *y*

The CO_2 emission coefficient $COEF_{i,y}$ is calculated based on the chemical composition of the fossil fuel type i, using the following approach:

If $FC_{i,j,y}$ is measured in a mass unit: $COEF_{i,y} = w_{C,i,y} * 44/12$ **(5)**

If $FC_{i,j,y}$ is measured in a volume unit: $COEF_{i,y} = w_{C,i,y} * \rho_{i,y} * 44/12$ **(6)**

Where:
$COEF_{i,y}$ = CO_2 emissions coefficient of fuel type *i* (tCO_2/mass or volume unit)
$w_{C,i,y}$ = Weighted average mass fraction of carbon in fuel type i in year y (tC/mass unit of the fuel)
$\rho_{i,y}$ = Weighted average density of fuel type i in year y (mass unit/volume unit of the fuel)
i = Fuel types combusted in process *j* during the year *y*

The energy consumption shall include all equipment/devices in the baseline treatment facility. If recovered biogas in the baseline is used to power auxiliary equipment it should be taken into account accordingly, using zero as its emission factor.

4. Methane emissions from the baseline wastewater treatment systems affected by the project ($BE_{ww,treatment,y}$) are determined using the COD removal efficiency of the baseline plant:

$$BE_{ww,treatment,y} = \sum_i (Q_{ww,i,y} * COD_{\inf low,i,y} * \eta_{COD,BL,i} * MCF_{ww,treatment,BL,i}) * B_{o,ww} * UF_{BL} * GWP_{CH4} \quad \textbf{(7)}$$

Where:

$Q_{ww,i,y}$ — Volume of wastewater treated in baseline wastewater treatment system *i* in year *y* (m^3). For *ex ante* estimation, forecasted wastewater generation volume or the designed capacity of the wastewater treatment facility can be used. However, the *ex post* emissions reduction calculation shall be based on the actual monitored volume of treated wastewater

$COD_{\inf low,i,y}$ — Chemical oxygen demand of the wastewater inflow to the baseline treatment system *i* in year *y* (t/m^3). Average value may be used through sampling with the confidence/precision level 90/10

$\eta_{COD,BL,i}$ — COD removal efficiency of the baseline treatment system *i*, determined as per the paragraphs 10, 11 or 12 below

$MCF_{ww,treatment,BL,i}$ — Methane correction factor for baseline wastewater treatment systems *i* (*MCF* values as per Table 3)

i — Index for baseline wastewater treatment system

$B_{o,ww}$	Methane producing capacity of the wastewater (IPCC value of 0.25 kg CH_4/kg COD)[1]
UF_{BL}	Model correction factor to account for model uncertainties (0.89)
GWP_{CH4}	Global Warming Potential for methane (value of 21)

If the baseline treatment system is different from the treatment system in the project scenario, the monitored values of the COD inflow during crediting period will be used to calculate the baseline emissions *ex post*.

5. The Methane Correction Factor (*MCF*) shall be determined based on the following table:

Table 3: IPCC default values for Methane Correction Factor (*MCF*)

Type of wastewater treatment and discharge pathway or system	***MCF* value**
Discharge of wastewater to sea, river or lake	0.1
Aerobic treatment, well managed	0.0
Aerobic treatment, poorly managed or overloaded	0.3
Anaerobic digester for sludge without methane recovery	0.8
Anaerobic reactor without methane recovery	0.8
Anaerobic shallow lagoon (depth less than 2 metres)	0.2
Anaerobic deep lagoon (depth more than 2 metres)	0.8
Septic system	0.5

6. Methane emissions from the baseline sludge treatment systems affected by the project activity are determined using the methane generation potential of the sludge treatment systems:

$$BE_{s,treatment,y} = \sum_j (S_{j,BL,y} * MCF_{s,treatment,BL,j}) * DOC_s * UF_{BL} * DOC_F * F * 16/12 * GWP_{CH4} \quad \textbf{(8)}$$

Where:

$S_{j,BL,y}$	Amount of dry matter in the sludge that would have been treated by the sludge treatment system *j* in the baseline scenario (t). For *ex ante* estimation, forecasted sludge generation volume or the designed capacity of the sludge treatment facility can be used. However, the *ex post* emissions reduction calculation shall be based on the actual monitored volume of treated sludge
j	Index for baseline sludge treatment system
DOC_s	Degradable organic content of the untreated sludge generated in the year *y* (fraction, dry basis). Default values of 0.257 for industrial sludge shall be used
$MCF_{s,treatment,BL,j}$	Methane correction factor for the baseline sludge treatment system *j* (*MCF* values as per Table 3)

[1] Project activities may use the default value of 0.6 kg CH_4/kg BOD, if the parameter $BOD_{5,20}$ is used to determine the organic content of the wastewater. In this case, baseline and project emissions calculations shall use BOD instead of COD in the equations, and the monitoring of the project activity shall be based in direct measurements of $BOD_{5,20}$, i.e. the estimation of BOD values based on COD measurements is not allowed.

DOC_F Fraction of DOC dissimilated to biogas (IPCC default value of 0.5)

F Fraction of CH_4 in biogas (IPCC default of 0.5)

If the sludge is composted, the following equation shall be applied:

$$BE_{s,treatment,y} = \sum_j S_{j,BL,y} * EF_{composting} * GWP_{CH4} \quad \textbf{(9)}$$

Where:

$EF_{composting}$ Emission factor for composting organic waste (t CH_4/t waste treated). The IPCC default value of 0.01 t CH_4/ t sludge treated on a dry weight basis shall be used

7. If the baseline wastewater treatment system is different from the treatment system in the project scenario, the sludge generation rate (amount of sludge generated per unit of COD removed) in the baseline may differ significantly from that of the project scenario. For example, it is known that the amount of sludge generated in aerobic wastewater systems is larger than in anaerobic systems, for the same COD removal efficiency. Therefore, for these cases, the monitored values of the amount of sludge generated during the crediting period will be used to estimate the amount of sludge generated in the baseline, as follows:

$$S_{j,BL,y} = S_{l,PJ,y} * \frac{SGR_{BL}}{SGR_{PJ}} \quad \textbf{(10)}$$

Where:

$S_{l,PJ,y}$ Amount of dry matter in the sludge treated by the sludge treatment system *l* in year *y* in the project scenario (t)

SGR_{BL} Sludge generation ratio of the wastewater treatment plant in the baseline scenario (tonne of dry matter in sludge/t COD removed). This ratio will be determined as per paragraphs 10, 11 or 12 below

SGR_{PJ} Sludge generation ratio of the wastewater treatment plant in the project scenario (tonne of dry matter in sludge/t COD removed). Calculated using the monitored values of COD removal and sludge generation in the project scenario

8. Baseline methane emissions from degradable organic carbon in treated wastewater discharged in e.g. a river, sea or lake in the baseline situation are determined as follows:

$$BE_{ww,discharge,y} = Q_{ww,discharge,BL,y} * GWP_{CH4} * B_{o,ww} * UF_{BL} * COD_{ww,discharge,BL,y} * MCF_{ww,BL,discharge} \quad \textbf{(11)}$$

Where:

$Q_{ww,discharge,BL,y}$ Volume of treated wastewater discharged in year *y* (m^3) in the baseline scenario

$COD_{ww,discharge,BL,y}$ Chemical oxygen demand of the treated wastewater discharged into sea, river or lake in the baseline situation in the year *y* (t/m^3).

$MCF_{ww,BL,discharge}$ Methane correction factor based on discharge pathway in the baseline situation (e.g. into sea, river or lake) of the wastewater (fraction) (*MCF* values as per Table 3)

To determine $COD_{ww,discharge,BL,y}$: if the baseline treatment system(s) is different from the treatment system(s) in the project scenario, the monitored values of the COD inflow during crediting period will be used to calculate the baseline emissions *ex post*. The outflow COD of the baseline systems will be estimated using the removal efficiency of the baseline treatment systems, estimated as per paragraphs 10, 11, and 12 below.

9. Methane emissions from anaerobic decay of the final sludge produced in the baseline situation are determined as follows:

$$BE_{s,final,y} = S_{final,BL,y} * DOC_s * UF_{BL} * MCF_{s,BL,final} * DOC_F * F * 16/12 * GWP_{CH4} \quad \textbf{(12)}$$

Where:

$S_{final,BL,y}$	Amount of dry matter in the final sludge generated by the baseline wastewater treatment systems in the year *y* (t). If the baseline wastewater treatment system is different from the project system, it will be estimated using the monitored amount of dry matter in the final sludge generated by the project activity ($S_{final,PJ,y}$) corrected for the sludge generation ratios of the project and baseline systems as per equation 10 above
$MCF_{s,BL,final}$	Methane correction factor of the disposal site that receives the final sludge in the baseline situation. A model correction factor of 0.85 shall be used for humid/wet conditions or 0.80 for dry conditions in accordance with the methodological tool "Emission from solid waste disposal sites" (Version 06.1.0)

10. In determining baseline emissions using equation 1, historical records of at least one year prior to the project implementation shall be used. This shall include for example the COD removal efficiency of the wastewater treatment systems, the amount of dry matter in sludge, power and electricity consumption per m^3 of wastewater treated the amount of final sludge generated per tonne of COD removed, and all other parameters required for determination of baseline emissions.

11. For wastewater treatment plant that has been operating for at least three years and if one year of historical data is not available, the following procedures shall be followed:

(a) All the available data in determining the required parameters (COD removal efficiency, specific energy consumption and specific sludge production) shall be used to determine the baseline emissions in year *y*;

(b) An *ex ante* measurement campaign shall be implemented to determine the required parameters (COD removal efficiency, specific energy consumption and specific sludge production). The measurement campaign shall be implemented in the baseline wastewater systems for at least 10 days. The measurements should be undertaken during a period that is representative for the typical operation conditions of the systems and ambient conditions of the site (temperature, etc). Average values from the measurement campaign shall be used and the result shall be multiplied by 0.89 to account for the uncertainty range (30% to 50%). The parameters from the measurement campaign are used to calculate the baseline emission in year *y*;

(c) The baseline emissions in year *y* is taken as the minimum between the result of (a) and (b).

12. In the case of Greenfield and capacity addition projects, or existing plant without three year operating history, the following procedures shall be used to determine the baseline emissions:

(1)For existing plant without three year operating history, procedures in paragraph 11 shall be followed;

(2)For Greenfield and capacity addition projects, one of the following procedures shall be used:

(a) Value obtained from a measurement campaign in a comparable existing wastewater treatment plant i.e. having similar environmental and technological circumstances for example treating similar type of wastewater. Average values from the measurement campaign shall be used and the result shall be multiplied by 0.89 to account for the uncertainty range (30% to 50%) associated with this approach. The treatment plant and wastewater source can be considered as similar as the baseline plant, whereby the measurement campaign can be implemented when following conditions can be fulfilled:

(i) The two sources of wastewater (wastewater treated in the selected plant and from the project activity) are of the same type, e.g. either domestic or industrial wastewater;

(ii) The selected plant and the baseline plants employ the same treatment technology, and the hydraulic retention times in their biological and physical treatment systems do not vary by more than 20%; and

(iii) For project activity treating industrial wastewater, both industries have the same raw material and final products, and apply the same industrial technology. Alternatively, different industrial wastewaters may be considered as similar if the following requirements are fulfilled:

- The ratio COD/BOD (related to the proportion of biodegradable organic matter) does not differ by more than 20%; and
- The ratio total COD / soluble COD (related to the proportion of suspended organic matter, and therefore to the sludge generation capacity) does not differ by more than 20%.

(b) Value provided by the manufacturer/designer of a Greenfield wastewater treatment plant using the same technology, demonstrated to be conservative, e.g. average values from the top 20 percent plants with lowest emission rate per ton COD removed among the plants installed in the last five years designed for the same country/region to treat the same type of wastewaters as the project activity.

Project Activity Emissions

13. Project activity emissions from the systems affected by the project activity are:

(i) CO_2 emissions from electricity and fuel used by the project facilities ($PE_{power,y}$);

(ii) Methane emissions from wastewater treatment systems affected by the project activity, and not equipped with biogas recovery in the project scenario ($PE_{ww,treatment,y}$);

(iii) Methane emissions from sludge treatment systems affected by the project activity, and not equipped with biogas recovery in the project situation ($PE_{s,treatment,y}$);

(iv) Methane emissions on account of inefficiency of the project activity wastewater treatment systems and presence of degradable organic carbon in treated wastewater ($PE_{ww,discharge,y}$);

(v) Methane emissions from the decay of the final sludge generated by the project activity treatment systems ($PE_{s,final,y}$);

(vi) Methane fugitive emissions due to inefficiencies in capture systems ($PE_{fugitive,y}$);

(vii) Methane emissions due to incomplete flaring ($PE_{flaring,y}$);

(viii) Methane emissions from biomass stored under anaerobic conditions which would not have occurred in the baseline situation ($PE_{biomass,y}$).

$$PE_y = \begin{Bmatrix} PE_{power,y} + PE_{ww,treatment,y} + PE_{s,treatment,y} + PE_{ww,discharge,y} + PE_{s,final,y} + \\ PE_{fugitive,y} + PE_{biomass,y} + PE_{flaring,y} \end{Bmatrix} \quad \textbf{(13)}$$

Where:

PE_y	Project activity emissions in the year *y* (tCO_2e)
$PE_{power,y}$	Emissions from electricity or fuel consumption in the year *y* (tCO_2e). These emissions shall be calculated as per paragraph 14, for the situation of the project scenario, using energy consumption data of all equipment/devices used in the project activity wastewater and sludge treatment systems and systems for biogas recovery and flaring/gainful use
$PE_{ww,treatment,y}$	Methane emissions from wastewater treatment systems affected by the project activity, and not equipped with biogas recovery, in year *y* (tCO_2e).
$PE_{s,treatment,y}$	Methane emissions from sludge treatment systems affected by the project activity, and not equipped with biogas recovery, in year *y* (tCO_2e).
$PE_{ww,discharge,y}$	Methane emissions from degradable organic carbon in treated wastewater in year *y* (tCO_2e).
$PE_{s,final,y}$	Methane emissions from anaerobic decay of the final sludge produced in year *y* (tCO_2e).
$PE_{fugitive,y}$	Methane emissions from biogas release in capture systems in year *y*, calculated as per paragraph 19 (tCO_2e)
$PE_{flaring,y}$	Project emissions from flaring of the residual gas in year *y*, calculated as per paragraph 20 (tCO_2e)
$PE_{biomass,y}$	Methane emissions from biomass stored under anaerobic conditions. CPAs shall not store biomass under anaerobic conditions in the project if such storage does not occur in the baseline scenario. Accordingly, the parameter $PE_{biomass,y}$ is zero for all CPAs. (tCO_2e)

14. Emissions from electricity or fuel consumption in the year *y* in the project scenario (PEpower,y) are calculated as follows:

$$PE_{power,y} = PE_{EC,y} + PE_{FC,l,y} \quad \textbf{(14)}$$

Where:

$PE_{power,y}$	=	Project emissions from electricity or fuel consumption in year *y* (tCO_2e)
$PE_{EC,y}$	=	Project emissions from electricity consumption in year *y* (tCO_2e)
$PE_{FC,l,y}$	=	Project emissions from fossil fuel combustion in process *l* during the year *y* (tCO_2e)

$$PE_{EC,y} = \sum_{j} \{EC_{PJ,j,y} * EF_{EL,j,y} * (1 + TDL_{j,y})\} \quad \textbf{(15)}$$

Where:

$EC_{PJ,j,y}$	=	Quantity of electricity consumed by the project electricity source *j* during the year *y* (MWh)
$EF_{EL,j,y}$	=	Emission factor for electricity generation for source *j* during the year *y* (tCO_2/MWh)
$TDL_{j,y}$	=	Average technical transmission and distribution losses for providing electricity to source *j* during the year *y*
j	=	Sources of electricity consumption in the baseline project scenario

$$PE_{FC,l,y} = \sum_{k} (FC_{k,l,y} * COEF_{k,y}) \quad \textbf{(16)}$$

Where:

$FC_{k,l,y}$	=	Quantity of fuel type *k* combusted in process *l* during the year *y* (mass or volume unit)
$COEF_{,k,y}$	=	CO_2 emissions coefficient of fuel type *k* during the year *y* (tCO_2/mass or volume unit)
k	=	Are the fuel types combusted in process *l* during the year *y*

The CO_2 emission coefficient $COEF_{k,y}$ is calculated based on the chemical composition of the fossil fuel type *k*, using the following approach:

If $FC_{k,l,y}$ is measured in a mass unit: $COEF_{k,y} = w_{C,k,y} * 44/12$ **(17)**

If $FC_{k,l,y}$ is measured in a volume unit: $COEF_{k,y} = w_{C,k,y} * \rho_{k,y} * 44/12$ **(18)**

Where:

$COEF_{k,y}$	=	CO_2 emissions coefficient of fuel type *k* (tCO_2/mass or volume unit)
$w_{C,k,y}$	=	Weighted average mass fraction of carbon in fuel type *k* in year y (tC/mass unit of the fuel)
$\rho_{k,y}$	=	Weighted average density of fuel type *k* in year y (mass unit/volume unit of the fuel)
k	=	Fuel types combusted in process *l* during the year *y*

The energy consumption shall include all equipment/devices used in the project activity treatment systems and systems for biogas recovery and flaring/gainful use.

15. Methane emissions from the project wastewater treatment system ($PE_{ww,treatment,y}$) are determined using the COD removal efficiency of the project plant:

$$PE_{ww,treatment,y} = \sum_{k} (Q_{ww,k,y} * COD_{\inf low,k,y} * \eta_{COD,PJ,k} * MCF_{ww,treatment,PJ,k}) * B_{o,ww} * UF_{PJ} * GWP_{CH4} \quad \textbf{(19)}$$

Where:

$Q_{ww,k,y}$	Volume of wastewater treated in project wastewater treatment system *k* in year *y* (m^3). For *ex ante* estimation, forecasted wastewater generation volume or the designed capacity of the wastewater treatment facility can be used. However, the *ex post* emissions reduction calculation shall be based on the actual monitored volume of treated wastewater
$COD_{\inf low,k,y}$	Chemical oxygen demand of the wastewater inflow to the project treatment system *k* in year *y* (t/m^3). Average value may be used through sampling with the confidence/precision level 90/10
$\eta_{COD,PJ,k}$	COD removal efficiency of the project treatment system k, measured based on inflow COD ($COD_{\inf low,k,y}$) and outflow COD ($COD_{outflow,k,y}$) in system k
$MCF_{ww,treatment,PJ,k}$	Methane correction factor for project wastewater treatment systems *k* (*MCF* values as per Table 3)
k	Index for project wastewater treatment system
UF_{PJ}	Model correction factor to account for model uncertainties (1.12)

16. Methane emissions from the project sludge treatment systems ($PE_{s,treatment,y}$) are determined using the methane generation potential of the sludge treatment systems:

$$PE_{s,treatment,y} = \sum_{l} (S_{l,PJ,y} * MCF_{s,treatment,PJ,l}) * DOC_s * UF_{PJ} * DOC_F * F * 16/12 * GWP_{CH4} \quad \textbf{(20)}$$

Where:

$S_{l,PJ,y}$	Amount of dry matter in the sludge that is treated by the sludge treatment system *l* in the project scenario (t). For *ex ante* estimation, forecasted sludge generation volume or the designed capacity of the sludge treatment facility can be used. However, the *ex post* emissions reduction calculation shall be based on the actual monitored volume of treated sludge
l	Index for baseline sludge treatment system
$MCF_{s,treatment,PJ,l}$	Methane correction factor for the project sludge treatment system *l* (*MCF* values as per Table 3 above)

If the sludge is composted, the following equation shall be applied:

$$PE_{s,treatment,y} = \sum_{l} S_{l,PJ,y} * EF_{composting} * GWP_{CH4} \quad \textbf{(21)}$$

17. Project methane emissions from degradable organic carbon in treated wastewater discharged in e.g. a river, sea or lake in the project situation are determined as follows:

$$PE_{ww,discharge,y} = Q_{ww,discharge,PJ,y} * GWP_{CH4} * B_{o,ww} * UF_{PJ} * COD_{ww,discharge,PJ,y} * MCF_{ww,PJ,discharge} \quad \textbf{(22)}$$

Where:

$Q_{ww,discharge,PJ,y}$	Volume of treated wastewater discharged in year *y* (m^3) in the project scenario
$COD_{ww,discharge,PJ,y}$	Chemical oxygen demand of the treated wastewater discharged into sea, river or lake in the project situation in the year *y* (t/m^3).
$MCF_{ww,PJ,discharge}$	Methane correction factor based on discharge pathway in the project situation (e.g. into sea, river or lake) of the wastewater (fraction) (*MCF* values as per Table 3 above

18. Methane emissions from anaerobic decay of the final sludge produced in the project situation are determined as follows:

$$PE_{s,final,y} = S_{final,PJ,y} * DOC_s * UF_{PJ} * MCF_{s,PJ,final} * DOC_F * F * 16/12 * GWP_{CH4} \quad \textbf{(23)}$$

Where:

$S_{final,PJ,y}$	Amount of dry matter in the final sludge generated by the project wastewater treatment systems in the year *y* (t).
$MCF_{s,PJ,final}$	Methane correction factor of the disposal site that receives the final sludge in the project situation. A model correction factor of 1shall be used in accordance with the methodological tool "Emission from solid waste disposal sites" (Version 06.1.0)

19. Project activity emissions from methane release in capture systems are determined as follows:

(a) Based on the methane emission potential of wastewater and/or sludge:

$$PE_{fugitive,y} = PE_{fugitive,ww,y} + PE_{fugitive,s,y} \quad \textbf{(24)}$$

Where:

$PE_{fugitive,ww,y}$	Fugitive emissions through capture inefficiencies in the anaerobic wastewater treatment systems in the year *y* (tCO_2e)
$PE_{fugitive,s,y}$	Fugitive emissions through capture inefficiencies in the anaerobic sludge treatment systems in the year *y* (tCO_2e)

$$PE_{fugitive,ww,y} = (1 - CFE_{ww}) * MEP_{ww,treatment,y} * GWP_{CH4} \quad \textbf{(25)}$$

Where:

CFE_{ww}	Capture efficiency of the biogas recovery equipment in the wastewater treatment systems (a default value of 0.9 shall be used)
$MEP_{ww,treatment,y}$	Methane emission potential of wastewater treatment systems equipped with biogas recovery system in year *y* (t)

$$MEP_{ww,treatment,y} = \sum_k (Q_{ww,k,y} * COD_{inflow,k,y} * \eta_{COD,PJ,k} * MCF_{ww,treatment,PJ,k}) * B_{o,ww} * UF_{PJ} \quad \textbf{(26)}$$

Where:

$Q_{ww,k,y}$	Volume of wastewater treated in project wastewater treatment system *k* equipped with biogas recovery in the year *y* (t/m^3)
$COD_{inflow,k,y}$	Chemical oxygen demand of the wastewater inflow to the project treatment

system *k* equipped with biogas recovery in the year *y* (t/m^3)

$\eta_{COD,PJ,k}$ COD removal efficiency of the project treatment system k, measured based on inflow COD ($COD_{\inf low,k,y}$) and outflow COD ($COD_{outflow,k,y}$) in system k equipped with biogas recovery in the year *y*

$MCF_{ww,treatment,PJ,k}$ Methane correction factor for the project wastewater treatment system *k* equipped with biogas recovery equipment (*MCF* values as per Table 3)

$$PE_{fugitive,s,y} = (1 - CFE_s) * MEP_{s,treatment,y} * GWP_{CH4} \quad \textbf{(27)}$$

Where:

CFE_s Capture efficiency of the biogas recovery equipment in the sludge treatment systems (a default value of 0.9 shall be used)

$MEP_{s,treatment,y}$ Methane emission potential of the sludge treatment systems equipped with a biogas recovery system in year *y* (t)

$$MEP_{s,treatment,y} = \sum_l (S_{l,PJ,y} * MCF_{s,treatment,PJ,l}) * DOC_s * UF_{PJ} * DOC_F * F * 16/12 \quad \textbf{(28)}$$

Where:

$S_{l,PJ,y}$ Amount of dry matter in the sludge that is treated by the sludge treatment system *l* equipped with biogas recovery equipment in the project scenario (t).

$MCF_{s,treatment,PJ,l}$ Methane correction factor for the project sludge treatment system *l* equipped with biogas recovery equipment (*MCF* values as per Table 3 above)

(b) Optionally a default value of 0.05 m³ biogas leaked/m³ biogas produced may be used as an alternative to calculations per equation 24 to 28.

20. Project activity emissions due to incomplete flaring in year *y* (tCO_2e) are calculated as follows:

For *ex ante* estimation of $PE_{flaring,y}$, baseline emission calculation for wastewater and/or sludge treatment can be used but without the consideration of GWP for CH4.

For *ex post* emission reduction calculations, $PE_{flaring,y}$ shall be calculated as per the methodological tool "Project emissions from flaring" (Version 02.0.0) by using actual monitored data as follows:

$$PE_{flaring,y} = GWP_{CH4} \times \sum_{m=1}^{525600} \{F_{CH4,RG,m} \times (1 - \eta_{flare,m})\} \times 10^{-3} \quad \textbf{(29)}$$

Where:

$PE_{flaring,y}$ = Project emissions from flaring of the residual gas in year *y* (tCO_2e)

GWP_{CH4} = Global warming potential of methane valid for the commitment period (tCO_2e/tCH_4)

$F_{CH4,RG,m}$ = Mass flow of methane in the residual gas in the minute m (kg)

$\eta_{flare,m}$ = Flare efficiency in minute m

The flare efficiency in minute *m* ($\eta_{flare,m}$) is determined as the average of two measurements of the flare efficiency made in year y ($\eta_{flare,y}$) as follows:

$$\eta_{flare,y} = 1 - \frac{1}{2} \sum_{t=1}^{2} \left(\frac{F_{CH4,EG,t}}{F_{CH4,RG,t}} \right) \quad \textbf{(30)}$$

Where:

$\eta_{flare,y}$	=	Flare efficiency in year *y*
$F_{CH4,EG,t}$	=	Mass flow of methane in the exhaust gas of the flare on a dry basis at reference conditions in the time period *t* (kg)
$F_{CH4,RG,t}$	=	Mass flow of methane in the residual gas in the time period *t* (kg)
t	=	The two time periods in year *y* during which the flare efficiency is measured, each a minimum of one hour and separated by at least six months

Mass flow of methane in the residual gas in minute *m* ($F_{CH4,RG,m}$) is calculated using the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (Version 02.0.0). According to the methodological tool "Project emissions from flaring" (Version 02.0.0), the parameter $F_{CH4,RG,m}$ shall be determined as the mass flow during minute m and shall be measured on a dry basis. This represents Option D of Table 1 of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (Version 02.0.0).

$$F_{CH4,RG,m} = V_{m,db} * v_{CH4,m,db} * \rho_{CH4,m} \quad \textbf{(31)}$$

Where:

$F_{CH4,RG,m}$	=	Mass flow of methane in the residual gas in minute *m* (kg)
$V_{m,db}$	=	Volumetric flow of the residual gas in minute *m* on a dry basis (m^3 dry gas/h)m^3 of dry gas)
$v_{CH4,m,db}$	=	Volumetric fraction of CH4 in the residual gas in minute *m* on a dry basis (m^3 CH4/m^3 of dry gas)
$\rho_{CH4,m}$	=	Density of CH4 in the residual gas in minute *m* (kg CH4/m^3 CH4)

$$\rho_{CH4,m} = \frac{P_m * MM_{CH4}}{R_u * T_m} \quad \textbf{(32)}$$

Where:

$\rho_{CH4,m}$	=	Density of CH4 in the residual gas in minute *m* (kg gas *i* / m^3 gas *i*)
P_m	=	Pressure of the residual gas in minute *m* (Pa)
MM_{CH4}	=	Molecular mass of CH4 (kg / kmol)
R_u	=	Universal ideal gases constant (Pa.m^3 / kmol.K)
T_m	=	Temperature of the residual gas in minute *m* (K)

$$V_{m,db} = M_{m,db} / \rho_{m,db} \quad \textbf{(33)}$$

Where:

$V_{m,db}$	=	Volumetric flow of the residual gas in minute *m* on a dry basis (m^3 dry gas/h)
$M_{m,db}$	=	Mass flow of the residual gas in minute *m* on a dry basis (kg/h)
$\rho_{m,db}$	=	Density of the residual gas in minute *m* on a dry basis (kg dry gas / m^3 dry gas)

$$\rho_{m,db} = \frac{P_m * MM_{m,db}}{R_u * T_m} \quad \textbf{(34)}$$

Where:

$\rho_{m,db}$	=	Density of the residual gas in minute *m* on a dry basis (kg dry gas / m^3 dry gas)
P_m	=	Pressure of residual gas in minute *m* (Pa)
$MM_{m,db}$	=	Molecular mass of the residual gas in minute *m* on a dry basis (kg dry gas / kmol

dry gas)
R_u = Universal ideal gases constant (Pa.m^3 / kmol.K)
T_m = Temperature of the residual gas in minute *m* (K)

$$MM_{m,db} = \sum_k (v_{k,m,db} * MM_k) \quad \textbf{(35)}$$

Where:
$MM_{m,db}$ = Molecular mass of the residual gas in minute *m* on a dry basis (kg dry gas / kmol dry gas
$v_{k,m,db}$ = Volumetric fraction of gas k in the residual gas in minute m on a dry basis (m^3 gas k / m^3 dry gas)
MM_k = Molecular mass of gas *k* (kg / kmol)
k = N_2, CH_4 (in accordance with the simplification outlined in Option 1 of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (Version 02.0.0).

The value for $F_{CH4,RG,t}$ is calculated using in accordance with the formulae for $F_{CH4,RG,m}$ and consists of the sum of methane flow in the minutes *m* that make up the time period *t*.

Leakage

21. If the technology is using equipment transferred from another activity, leakage effects at the site of the other activity are to be considered and estimated (LE_y).

Emission Reduction

22. Emission reductions shall be estimated *ex ante* in the PDD using the equations provided in the baseline, project and leakage emissions sections above. Emission reductions shall be estimated *ex ante* as follows:

$$ER_{y,ex\ ante} = BE_{y,ex\ ante} - (PE_{y,ex\ ante} + LE_{y,ex\ ante}) \quad \textbf{(36)}$$

Where:
$ER_{y,ex\ ante}$ *Ex ante* emission reduction in year *y* (tCO_2e)
$LE_{y,ex\ ante}$ *Ex ante* leakage emissions in year *y* (tCO_2e)
$PE_{y,ex\ ante}$ *Ex ante* project emissions in year *y* calculated as paragraph 13 (tCO_2e)
$BE_{y,ex\ ante}$ *Ex ante* baseline emissions in year *y* calculated as per paragraph 2 (tCO_2e)

23. *Ex post* emission reductions shall be determined for the case outlined in paragraph 1 (a) and 1 (e) of the Approved SSC Methodology AMS-III.H. (Version 16) as per paragraph 4. For cases outlined in paragraph 1 (b), 1 (c), 1 (d) and 1 (f) of the Approved SSC Methodology AMS-III.H. (Version 16), *ex post* emission reductions shall be based on the lowest value of the following, as per paragraph 18:

(i) The amount of biogas recovered and fuelled or flared (MD_y) during the crediting period, that is monitored *ex post*;

(ii) *Ex post* calculated baseline, project and leakage emissions based on actual monitored data for the project activity.

24. For cases 1 (b), 1 (c), 1 (d) and 1 (f) as outlined in paragraph 1 of the Approved SSC Methodology AMS-III.H. (Version 16): it is possible that the project activity involves wastewater and sludge treatment systems with higher methane conversion factors (*MCF*) or with higher efficiency than the treatment systems used in the baseline situation. Therefore the emission reductions achieved by the project activity is limited to the *ex post* calculated baseline emissions minus project emissions using the actual monitored data for the project activity. The emission reductions achieved in any year are the lowest value of the following:

$$ER_{y,ex\ post} = \min((BE_{y,ex\ post} - PE_{y,ex\ post} - LE_{y,ex\ post}), (MD_y - PE_{power,y} - PE_{biomass,y} - LE_{y,ex\ post})) \quad \textbf{(37)}$$

Where:

$ER_{y,ex\ post}$	Emission reductions achieved by the project activity based on monitored values for year *y* (tCO_2e)
$BE_{y,ex\ post}$	Baseline emissions calculated as per paragraph 2 using *ex post* monitored values
$PE_{y,ex\ post}$	Project emissions calculated as per paragraph 13 using *ex post* monitored values
MD_y	Methane captured and destroyed/gainfully used by the project activity in the year *y* (tCO_2e)

25. In the case of flaring/combustion MD_y will be measured using the conditions of the flaring process:

$$MD_y = BG_{burnt,y} * w_{CH4,y} * D_{CH4} * FE * GWP_{CH4} \quad \textbf{(38)}$$

Where:

$BG_{burnt,y}$	Biogas flared/combusted in year *y* (m^3)
$w_{CH4,y}$	Methane content[13] of the biogas in the year *y* (volume fraction)
D_{CH4}	Density of methane at the temperature and pressure of the biogas in the year *y* (t/m^3)
FE	Flare efficiency in year *y* (fraction). If the biogas is combusted for gainful purposes, e.g. fed to an engine, an efficiency of 100% may be applied

26. For the cases listed in paragraph 1 of the Approved SSC Methodology AMS-III.H. such as:

(a) Substitution of an aerobic wastewater or sludge treatment system with an anaerobic treatment system with methane recovery and combustion; and

(b) Introduction of an anaerobic wastewater treatment system with methane recovery and combustion to an untreated wastewater stream.

The emission reduction achieved by the project activity (*ex post*) will be the difference between the baseline emissions and the sum of the project emissions and leakage.

$$ER_y = BE_{y,ex\ post} - \left(PE_{y,ex\ post} + LE_{y,ex\ post}\right) \quad \textbf{(39)}$$

The historical records of electricity and fuel consumption, the COD content of untreated and treated wastewater, and the quantity of sludge produced by the replaced units will be used for the baseline calculation.

In case (a), if the volumetric flow and the characteristic properties (e.g. COD) of the inflow and outflow of the wastewater are equivalent in the project and the baseline scenarios (i.e. the project and baseline systems have the same efficiency for COD removal for wastewater treatment), then the higher energy consumption and sludge generation in the baseline scenario are the only significant differences contributing to emissions reductions in the project case. In this case, the emission reductions can be calculated as the difference between the historical energy consumption of the replaced unit and the recorded energy consumption of the new system, plus the difference in emissions from sludge treatment and/or disposal. Project emissions from fugitive emissions and incomplete flaring ($PE_{fugitive,y}$, $PE_{flaring,y}$) shall also be considered in the calculation of the emission reductions, however the emissions from the wastewater outflow and sludge ($PE_{ww,discharge,y}$, $PE_{s,final,y}$) may be disregarded, if they are equivalent in the baseline and project scenarios.

To make it more clear, the ex-ante estimation and the ex-post calculation of ER for the CPAs which adopt different measure/technology is summarized in the following Table 4.

Table 4. ER calculation for the CPAs which adopt different measure/technology

	For CPA adopts measure/ technology (a)	For CPA adopts measure/ technology (b)	For CPA adopts measure/ technology (c)	For CPA adopts measure/ technology (d)	For CPA adopts measure/ technology (e)	For CPA adopts measure/ technology (f)
Ex-ante estimation of ER	Using the equations (1)~(36) above	Using the equations (1)~(36) above	Using the equations (1)~(36) above	Using the equations (1)~(36) above	Using the equations (1)~(36) above	Using the equations (1)~(36) above
Ex-post calculation of ER	Using the equations (39) above	Using the equations (37) and (38) above	Using the equations (37) and (38) above	Using the equations (37) and (38) above	Using the equations (39) above	Using the equations (37) and (38) above

E.6.3. Data and parameters that are to be reported in CDM-SSC-CPA-DD form:

Data / Parameter:	$EC_{BL,k,y}$
Data unit:	MWh
Description:	Quantity of electricity that would be consumed by the baseline electricity consumption source *k* during the year *y*
Source of data used:	Historical records at CPA site
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.

Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$EF_{EL,k,y}$
Data unit:	$tCO2_e/MWh$
Description:	Emission factor for electricity generation for source *k* during the year *y*
Source of data used:	"Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (Version 01)
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value as per the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (Version 01).
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$TDL_{k,y}$
Data unit:	Fraction
Description:	Average technical transmission and distribution losses for providing electricity to source k
Source of data used:	"Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (Version 01).
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value as per the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (Version 01).
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$FC_{i,j,y}$
Data unit:	mass or volume unit
Description:	Quantity of fuel type i combusted in process j during the year y
Source of data used:	CPA owner
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions.

	This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$w_{c,i,y}$
Data unit:	tC/mass unit of the fuel
Description:	Weighted average mass fraction of carbon in fuel type k in year y
Source of data used:	Values provided by the fuel supplier in an invoice (preferable source). If this is not available, then measurements by the CPA owner.
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$\rho_{c,i,y}$
Data unit:	mass unit / volume unit of the fuel
Description:	Weighted average density of fuel type *i* in year y
Source of data used:	Values provided by the fuel supplier in an invoice (preferable source). If this is not available, then measurements by the CPA owner
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$Q_{ww,i,y}$
Data unit:	m^3
Description:	Volume of wastewater treated in baseline wastewater treatment system *i* in year y
Source of data used:	Historical data or measurement campaign. For Greenfield and capacity addition projects: (i) the value obtained from measurement campaign of comparable existing wastewater plant; (ii) the value provided by the manufacturer/designer of Greenfield wastewater treatment plant using the same technology, demonstrated to be conservative.
Value applied:	CPA specific
Justification of the choice of data or	In accordance with baseline and monitoring methodology.

description of measurement methods and procedures actually applied	
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), d), f).

Data / Parameter:	$COD_{\text{inf}\,low,i,y}$
Data unit:	tons/m3
Description:	Chemical oxygen demand of the wastewater inflow to the baseline wastewater treatment system *i* in year *y*
Source of data used:	Historical data or measurement campaign. For Greenfield and capacity addition projects: (i) the value obtained from measurement campaign of comparable existing wastewater plant; (ii) the value provided by the manufacturer/designer of Greenfield wastewater treatment plant using the same technology, demonstrated to be conservative.
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), d), f).

Data / Parameter:	$n_{COD,BL,i}$
Data unit:	Fraction
Description:	COD removal efficiency in of the baseline treatment system i
Source of data used:	Determined in accordance with paragraphs 26 – 28 of the baseline and monitoring methodology AMS.III-H. (Version 16).
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), d), f).

Data / Parameter:	$MCF_{ww,treatment,BL,i}$
Data unit:	Fraction
Description:	Methane correction factor for baseline wastewater treatment system i

Source of data used:	Table III.H.1 of Approved SSC Methodology AMS-III.H (Version 16)
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), d), f).

Data / Parameter:	$B_{o,ww}$
Data unit:	kg CH4/kg COD
Description:	Methane producing capacity of the wastewater
Source of data used:	Paragraph 20 of Approved SSC Methodology AMS-III.H (Version 16)
Value applied:	0.25
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions and project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), d), e), f).

Data / Parameter:	UF_{BL}
Data unit:	Fraction
Description:	Model correction factor to account of model uncertainty
Source of data used:	Paragraph 20 of Approved SSC Methodology AMS-III.H (Version 16)
Value applied:	0.89
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	GWP_{CH4}
Data unit:	Fraction
Description:	Global warming potential of methane
Source of data used:	Paragraph 20 of Approved SSC Methodology AMS-III.H (Version 16)
Value applied:	21
Justification of the choice of data or	In accordance with baseline and monitoring methodology.

description of measurement methods and procedures actually applied :	
Any comment:	Calculation of baseline emissions and project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$S_{j,BL,y}$
Data unit:	tons
Description:	Amount of dry matter in the sludge that would have been treated by the sludge treatment system *j* in the baseline scenario in year y.
Source of data used:	Historical data or measurement campaign. For Greenfield and capacity addition projects: (i) the value obtained from measurement campaign of comparable existing wastewater plant; (ii) the value provided by the manufacturer/designer of Greenfield wastewater treatment plant using the same technology, demonstrated to be conservative.
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$MCF_{s,treatment,BL,j}$
Data unit:	Fraction
Description:	Methane correction factor for baseline sludge treatment system j
Source of data used:	Table III.H.1 of Approved SSC Methodology AMS-III.H (Version 16)
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), c).

Data / Parameter:	DOC_s
Data unit:	Fraction
Description:	Degradable organic content of the untreated sludge generated in the year *y*
Source of data used:	Paragraph 22 of Approved SSC Methodology AMS-III.H (Version 16)

Value applied:	0.257
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions and project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	DOC_F
Data unit:	Fraction
Description:	Fraction of DOC dissimilated to biogas
Source of data used:	Paragraph 22 of Approved SSC Methodology AMS-III.H (Version 16)
Value applied:	0.5
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions and project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	F
Data unit:	Fraction
Description:	Fraction of CH_4 in biogas
Source of data used:	Paragraph 22 of Approved SSC Methodology AMS-III.H (Version 16)
Value applied:	0.5
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions and project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$EF_{composting}$
Data unit:	tons of CH_4 / t of waste (sludge) treated
Description:	Emission factor for composting organic waste
Source of data used:	IPCC default value
Value applied:	0.01 (dry weight basis)
Justification of the choice of data or	In accordance with baseline and monitoring methodology.

description of measurement methods and procedures actually applied :	
Any comment:	Calculation of baseline emissions and project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), e), f).

Data / Parameter:	SGR_{BL}
Data unit:	tons of dry matter in sludge/ton COD removed
Description:	Sludge generation ratio of the wastewater treatment plant in the baseline scenario
Source of data used:	This ratio will be determined as per paragraphs 26, 27 or 28 of Approved SSC Methodology AMS-III.H (Version 16).
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	SGR_{PJ}
Data unit:	tonne of dry matter in sludge/t COD removed
Description:	Sludge generation ratio of the wastewater treatment plant in the project scenario
Source of data used:	Calculated using the monitored values of COD removal (i.e. $COD_{inflow,i}$ minus $COD_{outflow,i}$) and sludge generation in the project scenario
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$Q_{ww,discharge,BL,y}$
Data unit:	m³
Description:	Volume of treated wastewater discharged in year *y* in the baseline scenario
Source of data used:	Historical data or measurement campaign. For Greenfield and capacity addition projects: (i) the value obtained from measurement campaign of comparable existing wastewater plant;

	(ii) the value provided by the manufacturer/designer of Greenfield wastewater treatment plant using the same technology, demonstrated to be conservative.
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), d), e), f).

Data / Parameter:	$COD_{ww,discharge,BL,y}$
Data unit:	tons / m^3
Description:	Chemical oxygen demand of the treated wastewater discharged into sea, river or lake in the baseline situation in year *y*
Source of data used:	Historical data or measurement campaign. For Greenfield and capacity addition projects: (i) the value obtained from measurement campaign of comparable existing wastewater plant; (ii) the value provided by the manufacturer/designer of Greenfield wastewater treatment plant using the same technology, demonstrated to be conservative.
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), d), e), f).

Data / Parameter:	$MCF_{ww,BL,discharge}$
Data unit:	Fraction
Description:	Methane correction factor based on discharge pathway in the baseline situation.
Source of data used:	Table III.H.1 of Approved SSC Methodology AMS-III.H (Version 16)
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), d), e), f).

Data / Parameter:	$S_{final,BL,y}$
Data unit:	tons
Description:	Amount of dry matter in the final sludge generated by the baseline wastewater treatment systems in the year *y*
Source of data used:	Historical data or measurement campaign. For Greenfield and capacity addition projects: (i) the value obtained from measurement campaign of comparable existing wastewater plant; (ii) the value provided by the manufacturer/designer of Greenfield wastewater treatment plant using the same technology, demonstrated to be conservative.
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$MCF_{s, BL, final}$
Data unit:	Fraction
Description:	Methane correction factor of the disposal site that receives the final sludge in the baseline situation
Source of data used:	Methodological tool "Emission from solid waste disposal sites" (Version 06.1.0).
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default values of the methodological tool "Emission from solid waste disposal sites" (Version 06.1.0) shall be used by CPAs. CPAs shall apply a model correction factor of 0.85 for humid/wet conditions or 0.80 for dry conditions.
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$EF_{EL,j,y}$
Data unit:	$tCO2_e/MWh$
Description:	Emission factor for electricity generation for source *j* during the year *y*
Source of data used:	"Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (Version 01)
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually	Default value as per the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (Version 01).

applied :	
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$TDL_{j,y}$
Data unit:	Fraction
Description:	Average technical transmission and distribution losses for providing electricity to source j
Source of data used:	"Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (Version 01).
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value as per the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (Version 01).
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$MCF_{ww,treatment,PJ,k}$
Data unit:	Fraction
Description:	Methane correction factor for project activity wastewater treatment system *k*
Source of data used:	Table III.H.1 of Approved SSC Methodology AMS-III.H (Version 16)
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), d), e), f).

Data / Parameter:	UF_{PJ}
Data unit:	Fraction
Description:	Model correction factor to account of model uncertainty
Source of data used:	Paragraph 29 of Approved SSC Methodology AMS-III.H (Version 16)
Value applied:	1.12
Justification of the choice of data or description of measurement methods and procedures actually	In accordance with baseline and monitoring methodology.

applied :	
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$MCF_{s,treatment,PJ,l}$
Data unit:	Fraction
Description:	Methane correction factor for project activity sludge treatment system *l*
Source of data used:	Table III.H.1 of Approved SSC Methodology AMS-III.H (Version 16)
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), e), f).

Data / Parameter:	$MCF_{ww,PJ,\ discharge}$
Data unit:	Fraction
Description:	Methane correction factor based on discharge pathway in the project activity situation
Source of data used:	Table III.H.1 of Approved SSC Methodology AMS-III.H (Version 16)
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), d), e), f).

Data / Parameter:	$MCF_{s,PJ,final}$
Data unit:	Fraction
Description:	Methane correction factor of the disposal site that receives the final sludge in the project activity situation.
Source of data used:	Estimated in accordance with the methodological tool "Emission from solid waste disposal sites" (Version 06.1.0)
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods	In accordance with baseline and monitoring methodology.

and procedures actually applied :	
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	CFE_{ww}
Data unit:	Fraction
Description:	Capture efficiency of the biogas recovery equipment in the wastewater treatment systems
Source of data used:	Paragraph 30 of Approved SSC Methodology AMS-III.H (Version 16)
Value applied:	0.9
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	CFE_{s}
Data unit:	Fraction
Description:	Capture efficiency of the biogas recovery equipment in the sludge treatment systems
Source of data used:	Paragraph 30 of Approved SSC Methodology AMS-III.H (Version 16)
Value applied:	0.9
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$PE_{flaring,ex\text{-}ante,y}$
Data unit:	tCO_2e
Description:	Ex-ante estimation of methane emissions due to incomplete flaring in year *y*
Source of data used:	Historical data or measurement campaign. For Greenfield and capacity addition projects: (i) the value obtained from measurement campaign of comparable existing wastewater plant; (ii) the value provided by the manufacturer/designer of Greenfield wastewater treatment plant using the same technology, demonstrated to be conservative.
Value applied:	CPA specific
Justification of the	In accordance with baseline and monitoring methodology.

choice of data or description of measurement methods and procedures actually applied :	
Any comment:	Calculation of project emissions. Calculated according to Equation 2 from Paragraph 20 and Equation 3 from Paragraph 21 of the Approved SSC Methodology AMS-III.H (Version 16) for ex-ante estimation. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	MM_{CH4}
Data unit:	kg/kmol
Description:	Molecular mass of methane
Source of data used:	Methodological tool “Project emissions from flaring" (Version 02.0.0)
Value applied:	16.04
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of project emissions

Data / Parameter:	MM_{N2}
Data unit:	kg/kmol
Description:	Molecular mass of nitrogen
Source of data used:	Methodological tool “Project emissions from flaring" (Version 02.0.0)
Value applied:	28.01
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of project emissions

Data / Parameter:	R_u
Data unit:	$Pa.m^3/kmol.K$
Description:	Universal ideal gas constant
Source of data used:	Methodological tool “Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (Version 02.0.0)
Value applied:	8,314
Justification of the choice of data or description of measurement methods	In accordance with baseline and monitoring methodology.

and procedures actually applied :	
Any comment:	Calculation of project emissions

E.7. Application of the monitoring methodology and description of the monitoring plan:

E.7.1. Data and parameters to be monitored by each SSC-CPA:

Data / Parameter:	$EC_{PJ,j,y}$
Data unit:	MWh
Description:	Quantity of electricity consumed by the project electricity source *j* during the year *y*
Source of data to be used:	Electricity meters installed at CPA site
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	Continuous measurements taken. Measured by an electricity meter.
QA/QC procedures to be applied:	The electricity meter will be calibrated and maintained according to manufacturer specifications and national standards. Data is recorded and stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$FC_{k,l,y}$
Data unit:	mass or volume unit
Description:	Quantity of fuel type k combusted in process l during the year y
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific

Description of measurement methods and procedures to be applied:	Continuous measurements taken. Use either mass or volume meters. In cases where fuel is supplied from small daily tanks, rulers can be used to determine mass or volume of the fuel consumed, with the following conditions: The ruler gauge must be part of the daily tank and calibrated at least once a year and have a book of control for recording the measurements (on a daily basis or per shift); Accessories such as transducers, sonar and piezoelectronic devices are accepted if they are properly calibrated with the ruler gauge and receiving a reasonable maintenance; In case of daily tanks with pre-heaters for heavy oil, the calibration will be made with the system at typical operational conditions.
QA/QC procedures to be applied:	The consistency of metered fuel consumption quantities should be cross-checked by an annual energy balance that is based on purchased quantities and stock changes. Where the purchased fuel invoices can be identified specifically for the CDM project, the metered fuel consumption quantities should also be cross-checked with available purchase invoices from the financial records. Data is recorded and stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$w_{c,k,y}$
Data unit:	tC/mass unit of the fuel
Description:	Weighted average mass fraction of carbon in fuel type k in year *y*
Source of data to be used:	Values provided by the fuel supplier in an invoice (preferable source). If this is not available, then measurements by the CPA owner.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	The mass fraction of carbon should be obtained for each fuel delivery, from which weighted average annual values should be calculated. Measurements are undertaken in line with national or international fuel standards.
QA/QC procedures to be applied:	Data is recorded and stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. Preferable data source should be used for $w_{c,k,y}$. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$\rho_{c,k,y}$
Data unit:	mass unit / volume unit of the fuel
Description:	Weighted average density of fuel type k in year y
Source of data to be used:	Values provided by the fuel supplier in an invoice (preferable source). If this is not available, then measurements by the CPA owner

Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	The density of the fuel should be obtained for each fuel delivery, from which weighted average annual values should be calculated. Measurements are undertaken in line with national or international fuel standards.
QA/QC procedures to be applied:	The flow meters will be calibrated and maintained according to manufacturer specifications. Data is recorded and stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. Applicable where $FC_{k,l,y}$ is measured in a volume unit. Preferable data source should be used for $\rho_{c,k,y}$. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$Q_{ww,k,y}$
Data unit:	m³
Description:	Volume of wastewater treated in project wastewater treatment system *k* in year *y*
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	Measurements are undertaken using flow meters.
QA/QC procedures to be applied:	Monitored continuously (at least hourly measurements are undertaken, if less, confidence/precision level of 90/10 shall be attained). The flow meter will be calibrated and maintained according to manufacturer specifications. Data is recorded and stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), d), e), f).

Data / Parameter:	$COD_{\inf low,k,y}$
Data unit:	tons/m³
Description:	Chemical oxygen demand of the wastewater inflow to the project treatment system *k* in year *y* (t/m^3).
Source of data to be used:	CPA owner
Value of data applied	CPA specific

for the purpose of calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	Measure the COD according to national or international standards. COD is measured through representative.
QA/QC procedures to be applied:	Samples and measurements shall ensure a 90/10 confidence/precision level. COD measurements are cross-checked at least once a year in an external laboratory to confirm onsite measurements. All equipment used in the measurement of COD shall be calibrated and maintained in according to manufacturer specifications. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), d), e), f)

Data / Parameter:	$COD_{outflow,k,y}$
Data unit:	t COD/m³
Description:	Chemical oxygen demand of the wastewater outflow after the project treatment system *k* in year *y* (t/m^3).
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	Measure the COD according to national or international standards. COD is measured through representative sampling.
QA/QC procedures to be applied:	Samples and measurements shall ensure a 90/10 confidence/precision level. COD measurements are cross-checked at least once a year in an external laboratory to confirm onsite measurements. All equipment used in the measurement of COD shall be calibrated and maintained in according to manufacturer specifications. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), d), e), f).

Data / Parameter:	$S_{l,PJ,y}$
Data unit:	tons
Description:	Amount of dry matter in the sludge that is treated by the sludge treatment system *l* in the project scenario
Source of data to be	CPA owner

used:	
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	Measure the total quantity of sludge on a wet basis. The volume (m^3) and density or direct weighing may be used to determine the sludge amount (wet basis). Representative samples are taken to determine the moisture content to calculate the total sludge amount on dry basis. If the methane emissions from anaerobic decay of the final sludge are to be neglected because the sludge is controlled combusted, disposed of in a landfill with methane recovery, or used for soil application, then the end-use of the final sludge will be monitored during the crediting period. If the baseline emissions include the anaerobic decay of final sludge generated by the baseline treatment systems in a landfill without methane recovery, the baseline disposal site shall be clearly defined, and verified by the DOE.
QA/QC procedures to be applied:	Monitoring of 100% of the sludge amount through continuous or batch measurements and moisture content through representative sampling to ensure the 90/10 confidence/precision level. All weight measurement equipment used shall be calibrated and maintained in according to manufacturer specifications. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), e), f).

Data / Parameter:	$Q_{ww,discharge,PJ,y}$
Data unit:	m^3
Description:	The volume of treated wastewater discharged in year *y* (m^3) in the project scenario
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	Measurements are undertaken using flow meters.
QA/QC procedures to be applied:	Monitored continuously (at least hourly measurements are undertaken, if less, confidence/precision level of 90/10 shall be attained). The flow meter will be calibrated and maintained according to manufacturer specifications. Data is recorded and stored in accordance with methodological requirements.

Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), d), e), f).

Data / Parameter:	$COD_{ww,discharge,PJ,y}$
Data unit:	tons /m³
Description:	The chemical oxygen demand of the wastewater discharged to river/water/lake after the treatment system affected by the project activity in year *y*
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	Measure the COD according to national or international standards. COD is measured through representative sampling.
QA/QC procedures to be applied:	Samples and measurements shall ensure a 90/10 confidence/precision level. COD measurements are cross-checked at least once a year in an external laboratory to confirm onsite measurements. All equipment used in the measurement of COD shall be calibrated and maintained in according to manufacturer specifications. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), d), e), f).

Data / Parameter:	$S_{final,PJ,y,}$
Data unit:	tons
Description:	Amount of dry matter in the sludge generated by the project wastewater treatment systems in the year *y*
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	Measure the total quantity of sludge on a wet basis. The volume (m^3) and density or direct weighing may be used to determine the sludge amount (wet basis). Representative samples are taken to determine the moisture content to calculate the total sludge amount on dry basis. If the methane emissions from anaerobic decay of the final sludge are to be neglected because the sludge is controlled combusted, disposed of in a landfill with methane recovery, or used for soil application, then the end-use of the final sludge will be monitored during the crediting period.

	If the baseline emissions include the anaerobic decay of final sludge generated by the baseline treatment systems in a landfill without methane recovery, the baseline disposal site shall be clearly defined, and verified by the DOE
QA/QC procedures to be applied:	Monitoring of 100% of the sludge amount through continuous or batch measurements and moisture content through representative sampling to ensure the 90/10 confidence/precision level. All weight measurement equipment used shall be calibrated and maintained in according to manufacturer specifications. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$F_{CH4,EG,t}$
Data unit:	kg
Description:	Mass flow of methane in the exhaust gas of the flare on a dry basis at reference conditions in the time period *t*
Source of data to be used:	Measurements undertaken by a third party accredited entity
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	Measured on a bi-annual basis. Values to be averaged at a one-minute interval or shorter time interval. Measure the mass flow of methane in the exhaust gas according to an appropriate national or international standard e.g. UKs Technical Guidance LFTGN05. The time period *t* over which the mass flow is measured must be at least one hour. The average flow rate to the flare during the time period *t* must be greater than the average flow rate observed for the previous six months.
QA/QC procedures to be applied:	According to the standard applied. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$M_{m,db}$
Data unit:	kg/h
Description:	Mass flow of the residual gas in minute *m* on a dry basis.
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific

Description of measurement methods and procedures to be applied:	Continuous measurements taken.
QA/QC procedures to be applied:	Calibration and frequency of calibration is according to manufacturer's specifications. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	T_m
Data unit:	K
Description:	Temperature of the residual gas in minute *m*
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	Continuous measurements taken. Instruments with recordable electronic signal (analogical or digital) are required. Examples include thermocouples, thermo resistance, etc
QA/QC procedures to be applied:	Periodic calibration against a primary device provided by an independent accredited laboratory is mandatory. Calibration and frequency of calibration is according to manufacturer's specifications. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. This parameter must be monitored continuously to assure the applicability condition related to the gaseous stream flow temperature being below 60ºC is met.This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	P_m
Data unit:	Pa
Description:	Pressure of the residual gas in minute *m*
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	Continuous measurements taken. Instruments with recordable electronic signal (analogical or digital) are required, such as pressure transducers, etc

QA/QC procedures to be applied:	Periodic calibration against a primary device must be performed and records of calibration procedures must be kept available as well as the primary device and its calibration certificate. Pressure transducers (either capacitive or resistive) must be calibrated monthly. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. Provided all parameters are converted to normal conditions during the monitoring process, this parameter may not be needed except for moisture content determination and therefore it should be metered only when performing such measurements (with same frequency). This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$v_{CH4,m,db}$
Data unit:	m^3 CH_4/m^3 dry gas
Description:	Volumetric fraction of methane in the residual gas in minute *m* on a dry basis
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	Continuous measurements taken by a gas analyser operating in dry-basis.
QA/QC procedures to be applied:	Calibration should include zero verification with an inert gas and at least one reading verification with a standard gas (single calibration gas or mixture calibration gas). All calibration gases must have a certificate provided by the manufacturer and must be under their validity period. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. The mass flow shall be measured on a dry basis in accordance with Option D of Table 1 of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream"(Version 02.0.0). This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$v_{N2,m,db}$
Data unit:	m^3 N_2/m^3 dry gas
Description:	Volumetric fraction of nitrogen in the residual gas in minute *m* on a dry basis
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific

Description of measurement methods and procedures to be applied:	Continuous measurements taken by a gas analyser operating in dry-basis.
QA/QC procedures to be applied:	Calibration should include zero verification with an inert gas and at least one reading verification with a standard gas (single calibration gas or mixture calibration gas). All calibration gases must have a certificate provided by the manufacturer and must be under their validity period. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. The mass flow shall be measured on a dry basis in accordance with Option D of Table 1 of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream"(Version 02.0.0). This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$T_{EG,m}$
Data unit:	°C
Description:	Temperature in the exhaust gas of the enclosed flare in minute *m*
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	Measured once per minute. Measure the temperature of the exhaust gas in the flare by an appropriate temperature measurement equipment. Measurements outside the operational temperature specified by the manufacturer may indicate that the flare is not functioning correctly and may require maintenance. Flare manufacturers must provide suitable monitoring ports for the monitoring of the temperature of the flare. These would normally be expected to be in the middle third of the flare. Where more than one temperature port is fitted to the flare, the flare manufacturer must provide written instructions detailing the conditions under which each location shall be used and the port most suitable for monitoring the operation of the flare according to manufacturers specifications for temperature.
QA/QC procedures to be applied:	Temperature measurement equipment should be replaced or calibrated in accordance with their maintenance schedule. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. Unexpected changes such as a sudden increase/drop in temperature can occur for different reasons. These events should be noted in the site records along with any corrective action that was implemented to correct the issue. Monitoring of this parameter is applicable in case of enclosed flares. Measurements are required to determine if manufacturer's flare specifications for operating temperature are met. This parameter is applicable to the following technologies/measures listed in

	Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$Flame_m$
Data unit:	Flame on or Flame off
Description:	Flame detection of flare in the minute m
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	Measured once per minute. Detection of flame recorded as a minute that the flame was on, otherwise recorded as a minute that the flame was off. Measure using a fixed installation optical flame detector: Ultra Violet detector or Infra Red or both.
QA/QC procedures to be applied:	Equipment shall be maintained and calibrated in accordance with manufacturer's recommendations. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. Applicable to all flares. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$Maintenance_y$
Data unit:	Calendar dates
Description:	Maintenance events completed in year *y*
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	Measured annually. Record the date that maintenance events were completed in year *y*. Records of maintenance logs must include all aspects of the maintenance including the details of the person(s) undertaking the work, parts replaced, or needing to be replaced, source of replacement parts, serial numbers and calibration certificates.
QA/QC procedures to be applied:	Records must be kept in a maintenance log for two years beyond the life of the flare. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. Monitoring of this parameter is required for the case of enclosed flares and the project participant selects Option B to determine flare efficiency. These dates are required so that they can be compared to the maintenance schedule to check that maintenance events were completed within the minimum time between maintenance events specified by the manufacturer (SPEC,flare). This parameter is applicable to the following technologies/measures listed in

	Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$BG_{burnt,y}$
Data unit:	m^3
Description:	Biogas volume in year
Source of data to be used:	Measured with continuous flow meters
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Not applicable for ex-ante estimations
Description of measurement methods and procedures to be applied:	In all cases, the amount of biogas recovered, fuelled, flared or otherwise utilized (e.g. injected into a natural gas distribution grid or distributed via a dedicated piped network) shall be monitored *ex post*, using continuous flow meters. If the biogas streams flared and fuelled (or utilized) are monitored separately, the two fractions can be added together to determine the total biogas recovered, without the need to monitor the recovered biogas before the separation. The methane content measurement shall be carried out close to a location in the system where a biogas flow measurement takes place
QA/QC procedures to be applied:	Monitored continuously (at least hourly measurements are undertaken, if less, confidence/precision level of 90/10 shall be attained) All flow meters used shall be calibrated and maintained in according to manufacturer specifications. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: b), c), d), f)

Data / Parameter:	$w_{CH4,y}$
Data unit:	%
Description:	Methane content in biogas in the year *y*
Source of data to be used:	The fraction of methane in the gas should be measured with a continuous analyser or, alternatively, with periodical measurements at a 90/10 confidence/precision level.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Not applicable for ex-ante estimations
Description of measurement methods and procedures to be applied:	The fraction of methane in the gas should be measured with a continuous analyser or, alternatively, with periodical measurements at a 90/10 confidence/precision level. It shall be measured using equipment that can directly measure methane content in the biogas - the estimation of methane content of biogas based on measurement of other constituents of biogas such as CO_2 is not permitted. The methane content measurement shall be carried out close to a location in the system where a biogas flow measurement takes place
QA/QC procedures to	Monitored continuously (at least hourly measurements are undertaken, if less,

be applied:	confidence/precision level of 90/10 shall be attained) All flow meters used shall be calibrated and maintained in according to manufacturer specifications. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: b), c), d), f).

E.7.2. Description of the monitoring plan for a SSC-CPA:

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Each CPA adopts the monitoring methodology in accordance with Approved SSC Methodology AMS-III.H. (Version 16) "Methane recovery in wastewater treatment".

This monitoring plan is designed to ensure that the Designated Operational Entity (DOE) is able to verify the data from the CPA. The CME will ensure that the monitoring plan is consistently applied for each CPA in accordance with the PoA-DD and the Approved SSC Methodology AMS-III.H. (Version 16)

1. Management Structure and responsibilities

Each CPA owner appoints a person who is responsible for ensuring that monitoring equipment is maintained and operated in accordance with manufacturer specifications. This person will also receive training from the manufacturer on how to operate the monitoring equipment and perform maintenance on the monitoring equipment before the commissioning of the CPA. The CME will support the CPA owner in order to ensure that sufficient training was provided to the CPA owner in order for the CPA owner to be able to collect the monitoring data. The CME, as entity responsible for the coordination and implementation of the PoA will ensure that monitoring will be implemented in accordance with the POA-DD and the Approved SSC Methodology AMS-III.H. (Version 16).

The CPA owner will report to the CME on a monthly basis regarding the collection of data and confirm that the monitoring plan is implemented in accordance with PoA guidelines and in accordance with Approved SSC Methodology AMS-III.H. (Version 16). The CME will make field-checks when appropriate to ensure that the monitoring plans are properly implemented by the CPA owners.

2. Data Collection

The CPA owner will be responsible for the data collection. The CPA will use continuous flow meters and equipment to monitor the quantity of wastewater and monitor all other parameters required including the chemical oxygen demand of the wastewater before and after the treatment system affected by the project activity, the amount of dry matter in the sludge, flare efficiency at the CPA site as required by the monitoring methodology. The equipment will be serviced, calibrated and maintained in accordance with manufacturer's instructions and complete records of such service, calibration and maintenance will be kept. Measured data will be recorded electronically and converted in accordance with Approved SSC Methodology AMS-III.H. (Version 16). This data will subsequently be used to calculate emission reductions in accordance with the Approved SSC Methodology AMS-III.H. (Version 16).

100% of the data should be monitored if not indicated otherwise.

The data, as much as possible, will be collected through electronic transmission of data from the monitoring equipment to the offices of the person appointed by the CPA owner for responsibility for monitoring. Data which cannot be collected through electronic means, shall be collected by qualified and

trained personnel only in intervals as required by the approved SSC Methodology AMS-III.H. (Version 16).

All data continuously measured will be electronically archived. At the same time, data monitored will be checked manually every day and recorded in hard copy measurement tables. The electronic records and paper copies are kept for 2 years after the end of the crediting period in compliance with approved SSC Methodology AMS-III.H. (Version 16).

3. Data calibration
All measurements are taken utilising calibrated measurement equipment according to international / national / sectoral/industry standards as applicable. Calibration will be done in accordance with relevant international standards or manufacturer's requirements..

4. Data handling
The CME will develop and implement a protocol for adequate record keeping and data monitoring systems. The data recorded by the CPA owner will be transmitted to the CME within ten business days after the end of each calendar month. Transmission of the data is generally done by electronic means, such as online or via email. If such transmission is not possible, then data shall be provided from the CPA owner to the CME by means of sending the data by mail via electronic storage devices or as hard copies.

5. Data quality control
All data transmitted by the CPA owner to the CME will be checked by the CME to ensure the accuracy and completeness of the data. In case of mistakes, corrective action will be taken to avoid similar mistakes in the future.

6. Reporting
The CPA owner transmits copies of completed worksheets on a monthly basis while maintaining originals on file. The CPA owner should prepare a brief annual report which should include information on overall project performance, emission reductions generated and verified and comparison with targets, etc. The report can be combined with the periodic verification report.

The CME will use the collected data to calculate emission reductions. The CME will also be responsible for the preparation of monitoring reports on a monthly basis and work with the DOE on the verification of the monitored data.

7. Data archiving
All data collected as part of monitoring will be archived electronically and be kept at least for 2 years after the end of the last crediting period. The CPA owner will keep both electronic copies of the data, as well as paper copies of the data at the offices of the CPA owner. Additionally, all monitoring data will be kept electronically and as paper copies by the CME, which ensures that data can centrally be made available to a Designated Operational Entity (DOE) upon request.

8. Training
At least three (3) technicians will be trained for each CPA on the operation and maintenance of the monitoring equipment by the manufacturer before the commissioning of the project. This training will ensure that trained technicians are able to operate the equipment properly and perform routine maintenance procedures on the monitoring equipment in order to ensure that the parameters listed in this section can be monitored accurately and in accordance with individual parameter requirements.

The CME will liaise with the CPA owner to ensure that ongoing training will be provided by the manufacturer of the monitoring equipment to ensure that a sufficient number of technicians is adequately trained to operate and maintain the monitoring equipment in accordance with manufacturer requirements and this monitoring plan. The initial training of technicians has to be performed before the start of the first monitoring period of the CPA.

E.8 Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible person(s)/entity(ies)

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The completion date of the application of the baseline study and monitoring methodology is the 17/11/2011

The baseline study and monitoring methodology was prepared by:
Mr. Kwak Man Su
Institute of Thermal Engineering
State Academy of Sciences, Pyongyang, DPR Korea.
Address: PO. Box504, Jungsong-dong, Central District
Email: gbcio@star-co.net.kp
Tel: +850 2 381 5926
FAX: +850 2 381 4654

The Institute of Thermal Engineering of the State Academy of Sciences, Pyongyang, DPR Korea is not a project participant.

Annex 1

CONTACT INFORMATION ON COORDINATING/MANAGING ENTITY and PARTICIPANTS IN THE PROGRAMME of ACTIVITIES

Organization:	Carbon Development and Trading Ltd.
Street/P.O.Box:	Suite 520, 152-160 City Road
Building:	Kemp House
City:	London
State/Region:	London
Postfix/ZIP:	EC1V 2NX
Country:	United Kingdom
Telephone:	+44 207 125 0385
FAX:	+44 207 125 0385
E-Mail:	carbondevelopment@gmail.com
URL:	
Represented by:	Ms. Jacqueline Wai Ying Luke
Title:	
Salutation:	Ms.
Last Name:	Luke
Middle Name:	Wai Ying
First Name:	Jacqueline
Department:	
Mobile:	
Direct FAX:	+44 207 125 0385
Direct tel:	+44 207 125 0385
Personal E-Mail:	carbondevelopment@gmail.com

Organization:	General Bureau for Cooperation with International Organizations
Street/P.O.Box:	PO. Box504, Jungsong-dong, Central District
Building:	
City:	Pyongyang
State/Region:	Pyongyang
Postfix/ZIP:	
Country:	Democratic People's Republic of Korea
Telephone:	+850 2 381 5926
FAX:	+850 2 381 4654
E-Mail:	gbcio@star-co.net.kp
URL:	
Represented by:	Mr. Ri Yong Nam
Title:	Director
Salutation:	Mr.
Last Name:	Ri
Middle Name:	
First Name:	Yong Nam
Department:	Carbon Trade Division
Mobile:	
Direct FAX:	+850 2 381 4654
Direct tel:	+850 2 381 5926
Personal E-Mail:	gbcio@star-co.net.kp

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding from Parties is provided for the PoA as stated in section A.4.5.

Annex 3

BASELINE INFORMATION

No additional information provided here.

Annex 4

MONITORING INFORMATION

No additional information provided here.

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